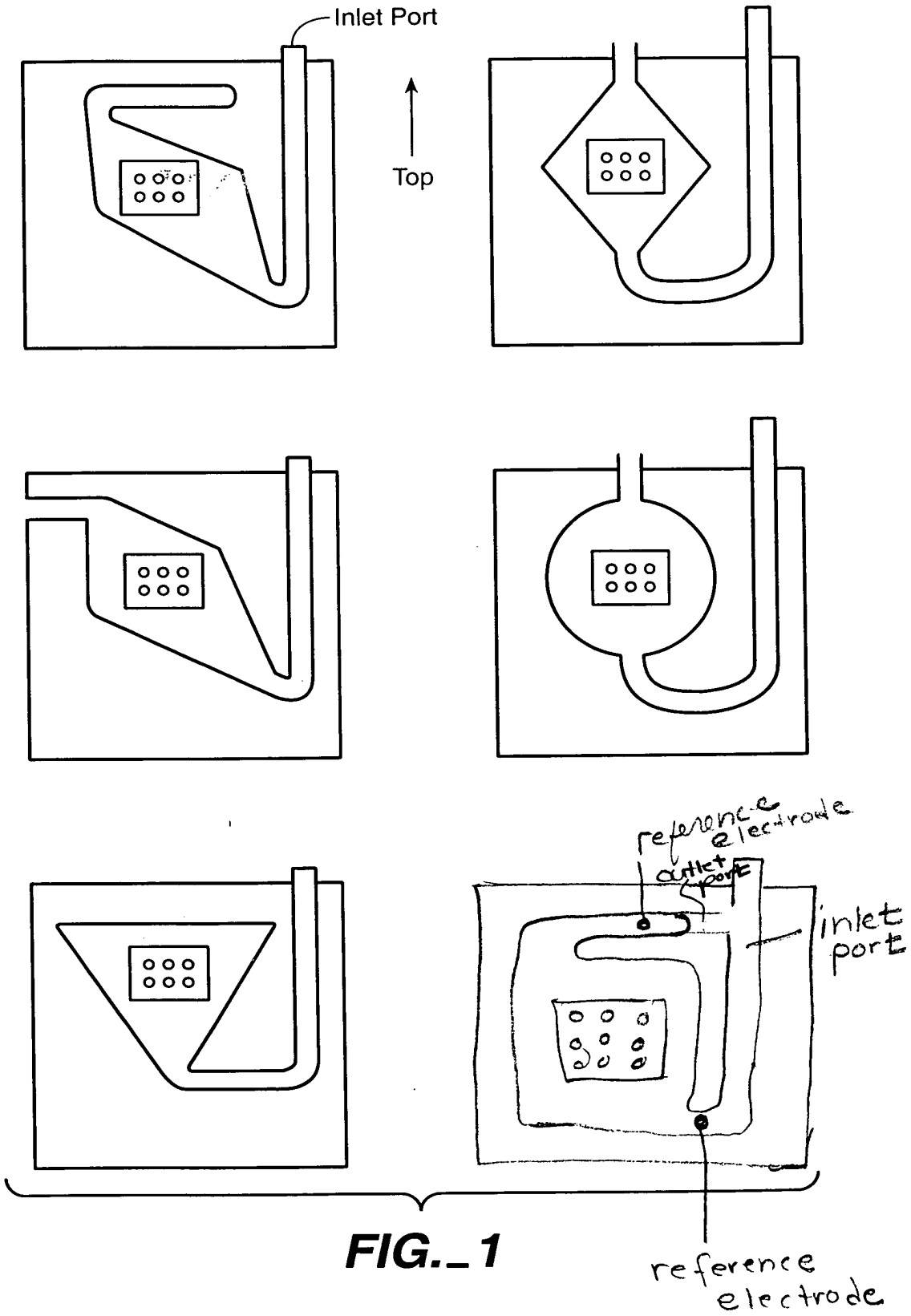
Inlet Port
Top
reference electrode
outlet port
inlet port
reference electrode

FIG._1

TOTTZO' SZTNOGGO

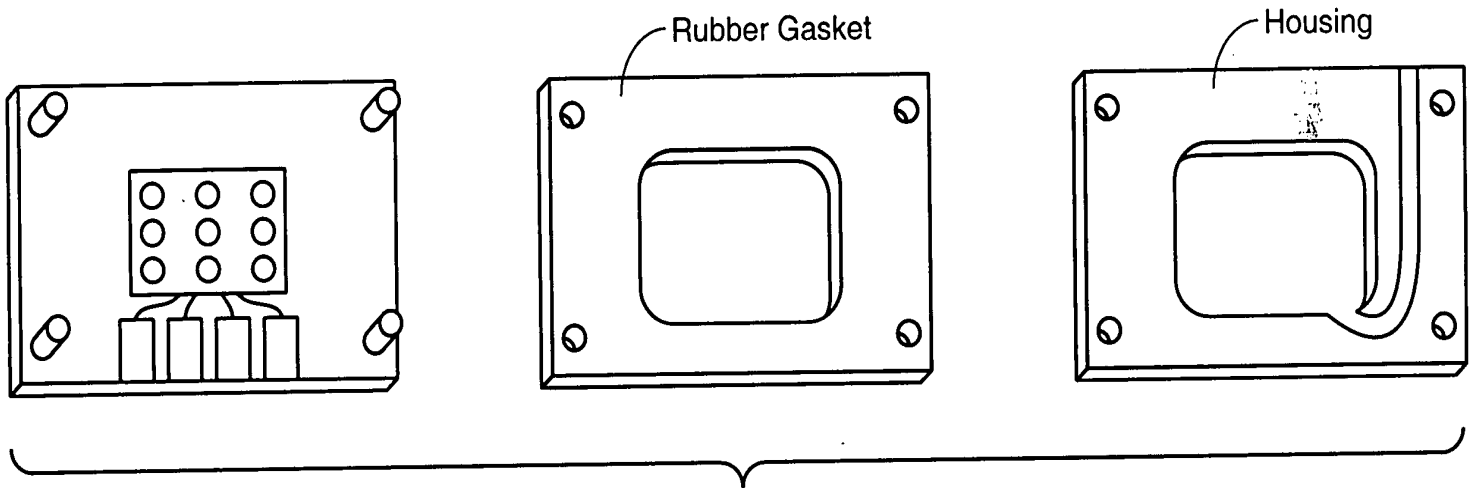

FIG._2

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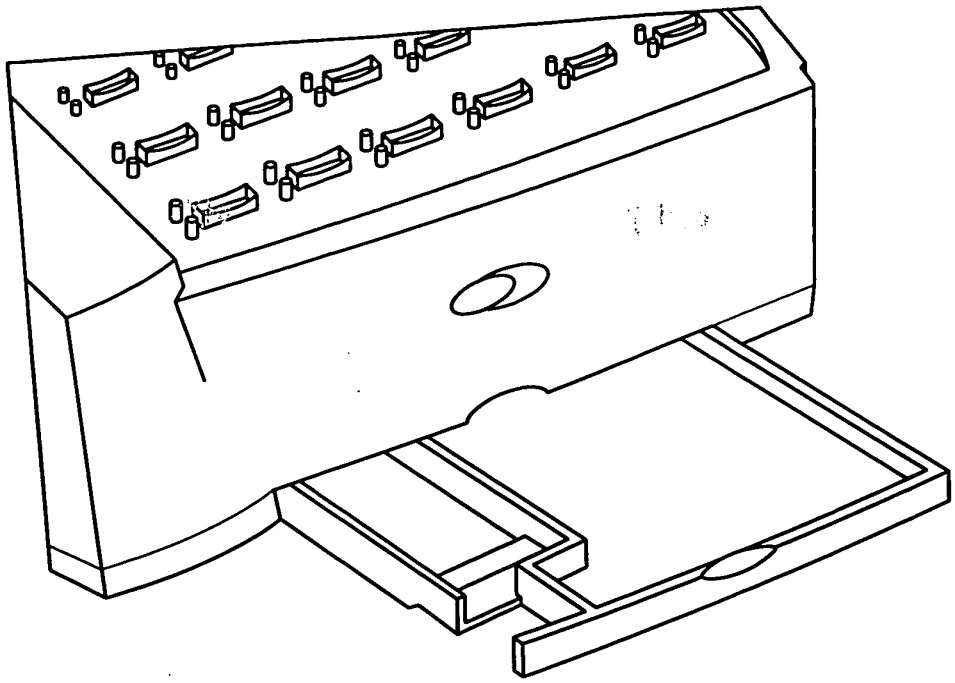

FIG._3A

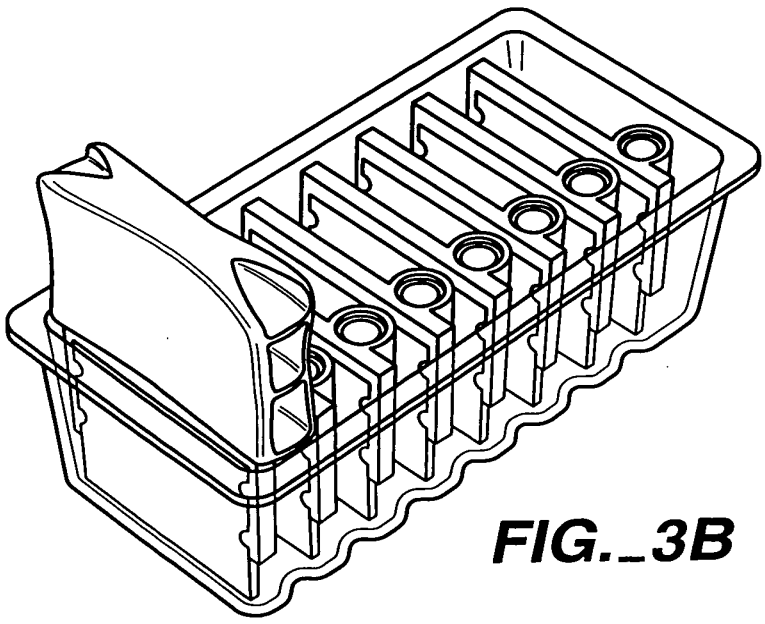

FIG._3B

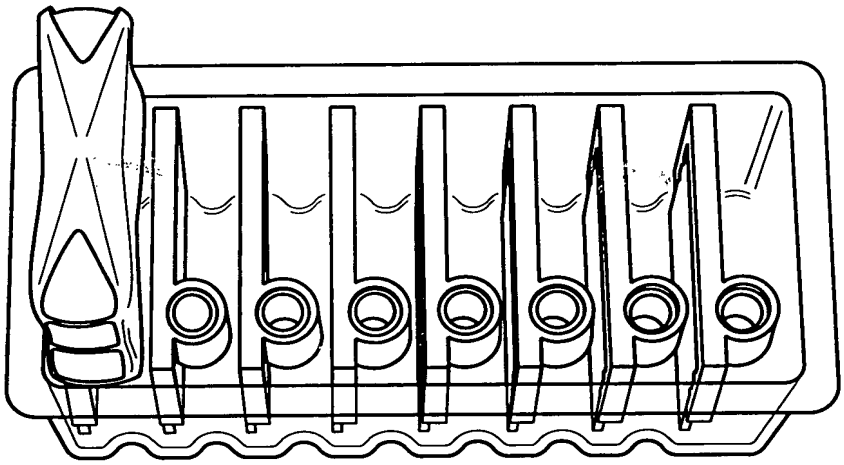

FIG._3C

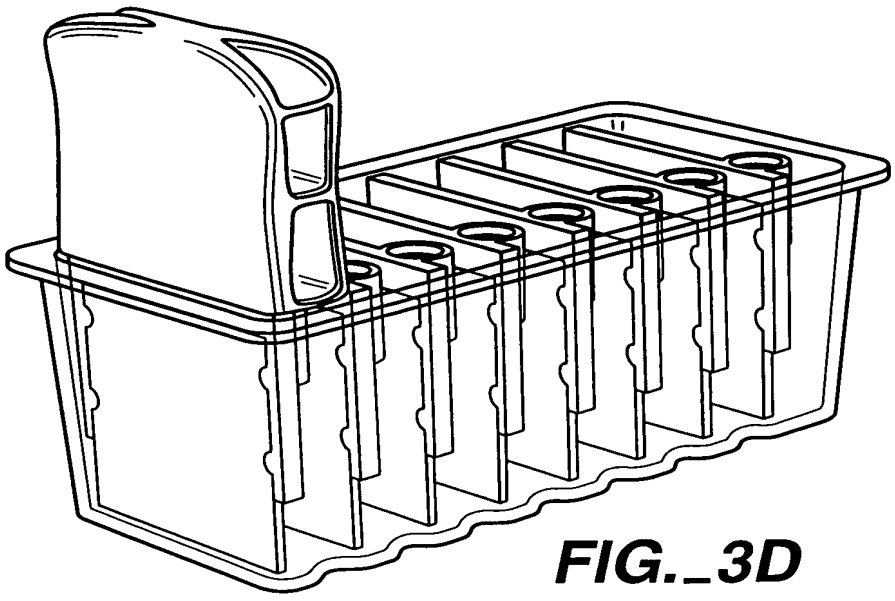

FIG._3D

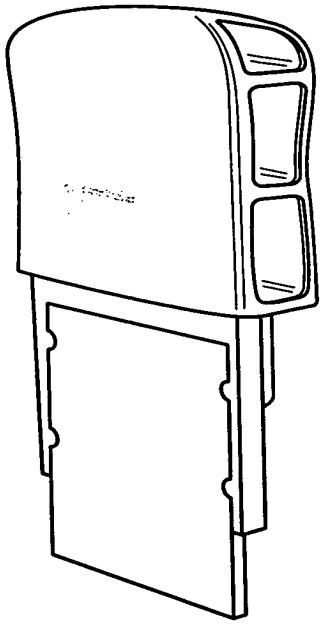

FIG._3E

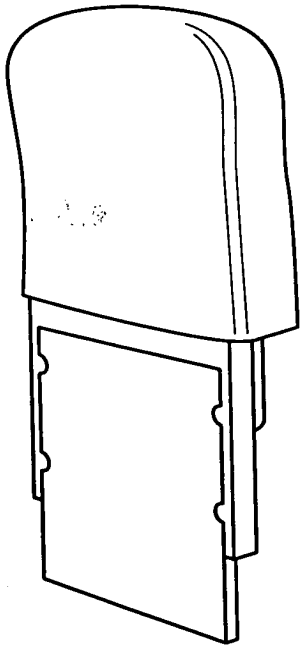

FIG._3F

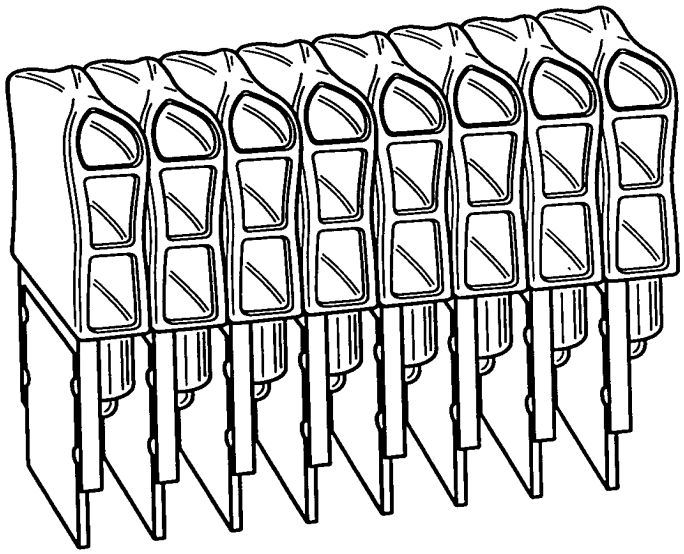

FIG._3G

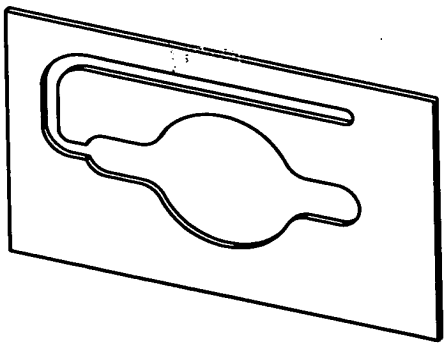

FIG._4A

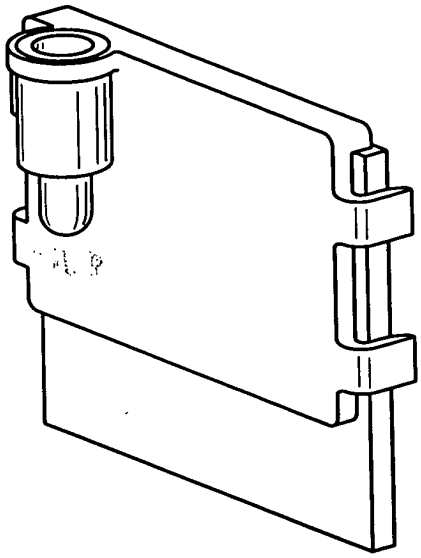

FIG._4B

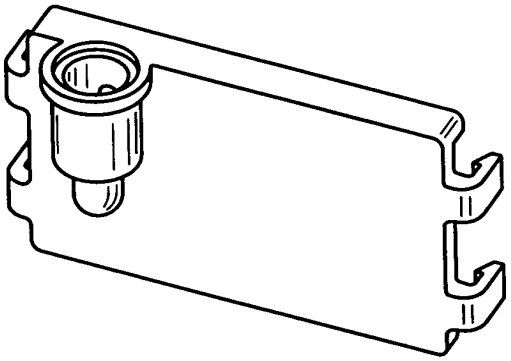

FIG._4C

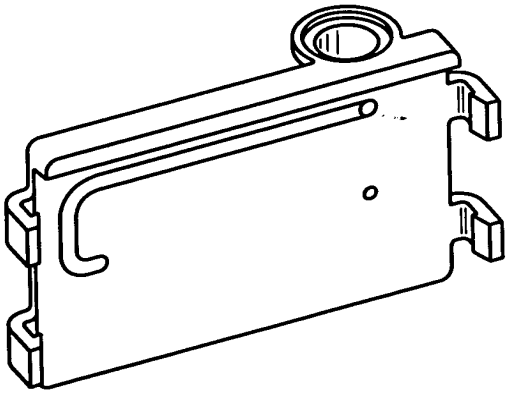

FIG._4D

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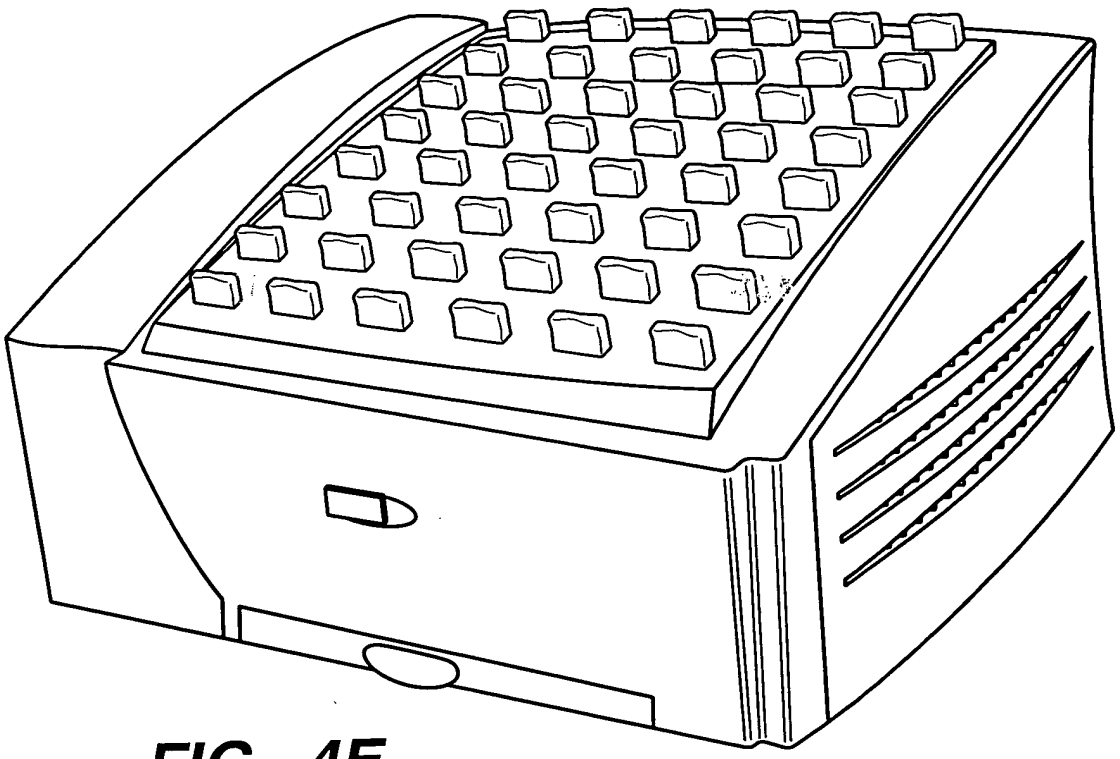


FIG._4E

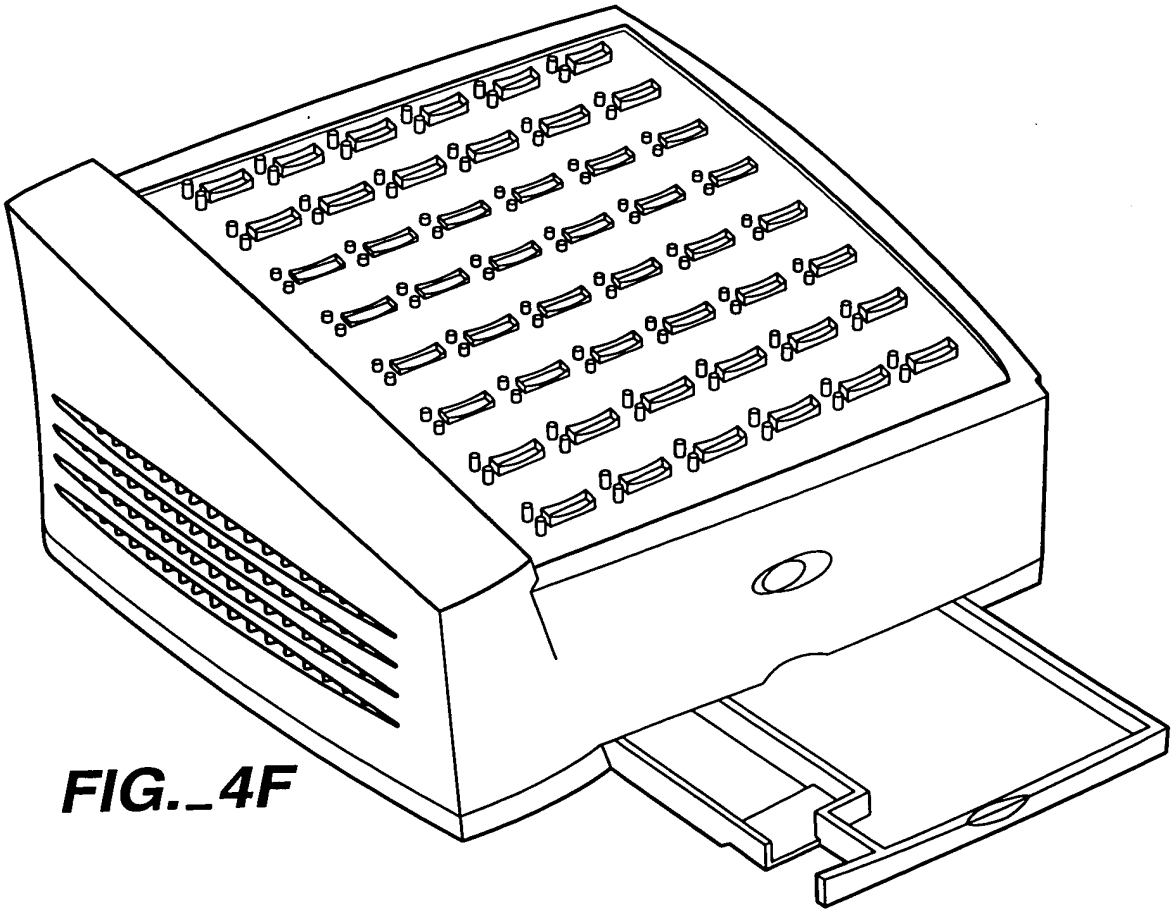


FIG._4F

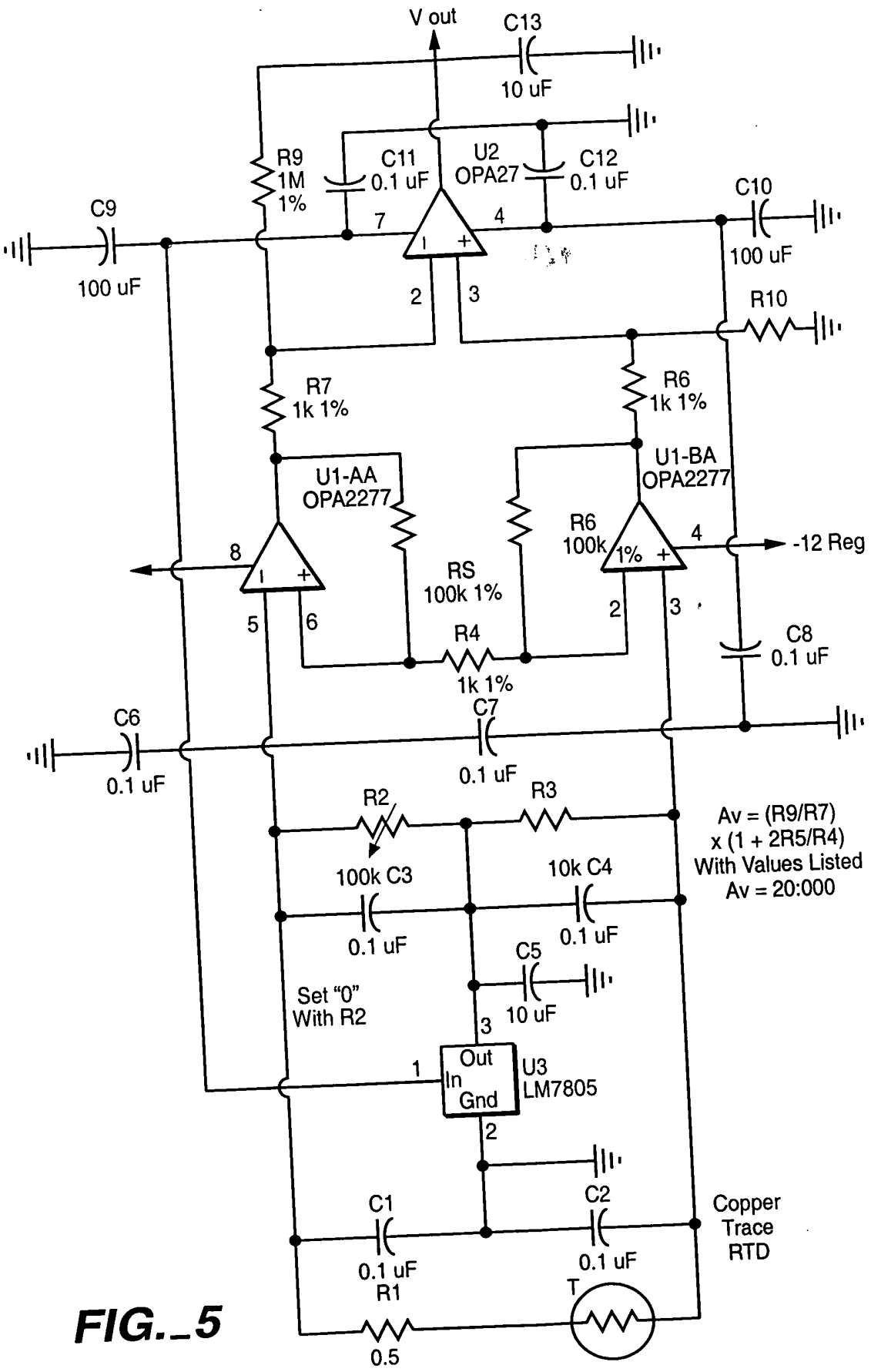

V out
C13
10 uF
R9
1M
1%
C11
0.1 uF
U2
OPA27
C12
0.1 uF
C10
100 uF
C9
100 uF
7
4
1
+
2
3
R10
R7
1k 1%
R6
1k 1%
U1-AA
OPA2277
U1-BA
OPA2277
8
1
+
5
6
RS
100k 1%
R4
1k 1%
R6
100k
1%
+
4
-12 Reg
2
3
C8
0.1 uF
C6
0.1 uF
C7
0.1 uF
R2
R3
100k C3
0.1 uF
10k C4
0.1 uF
C5
10 uF
Set "0"
With R2
3
1
Out
In
Gnd
U3
LM7805
2
C1
0.1 uF
R1
C2
0.1 uF
T
0.5
Copper
Trace
RTD
Av = (R9/R7)
x (1 + 2R5/R4)
With Values Listed
Av = 20:000

FIG._5

FOFF20" SZ7n0660

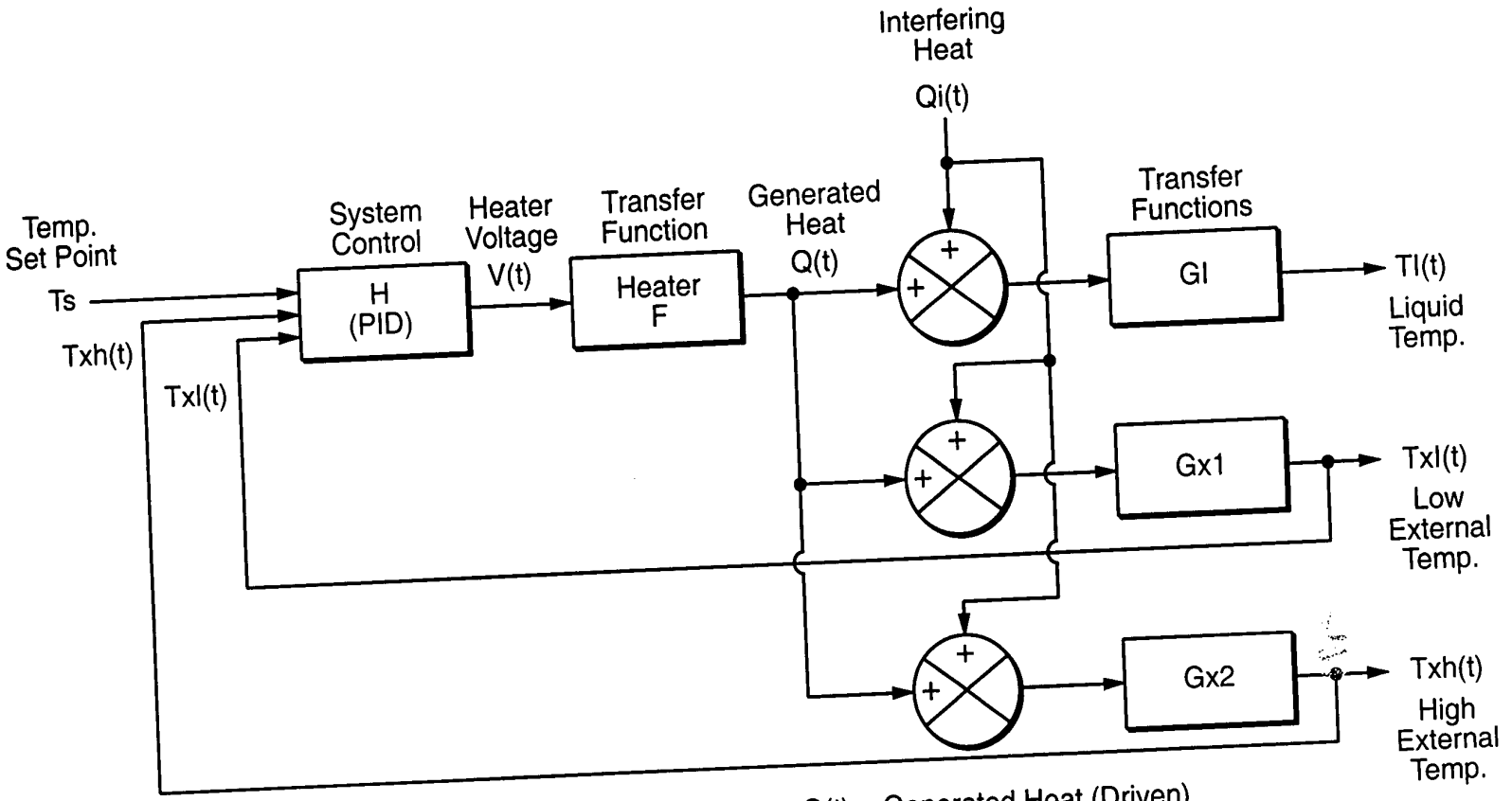


FIG._6

FOTEX 20" SETH0660

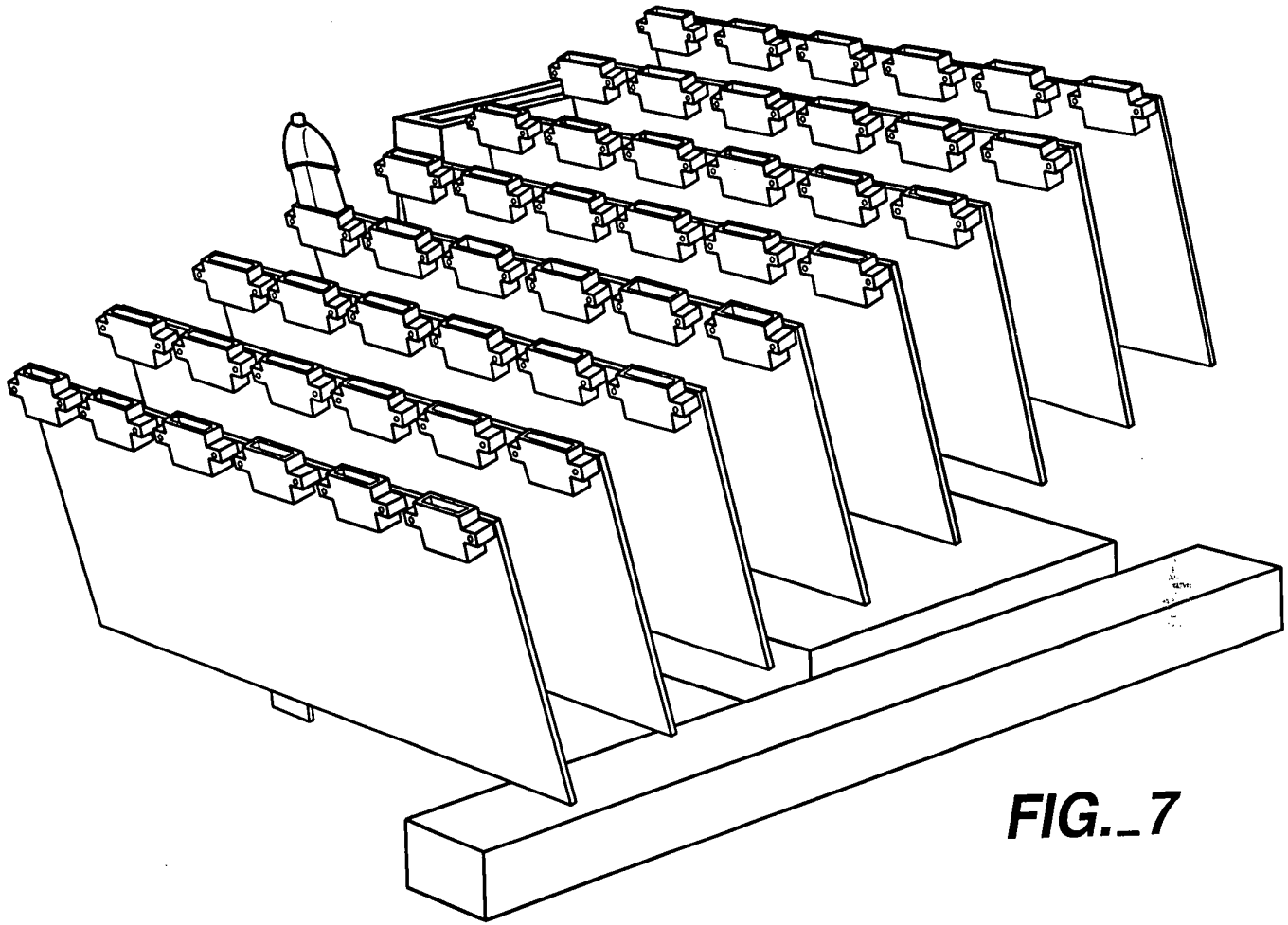
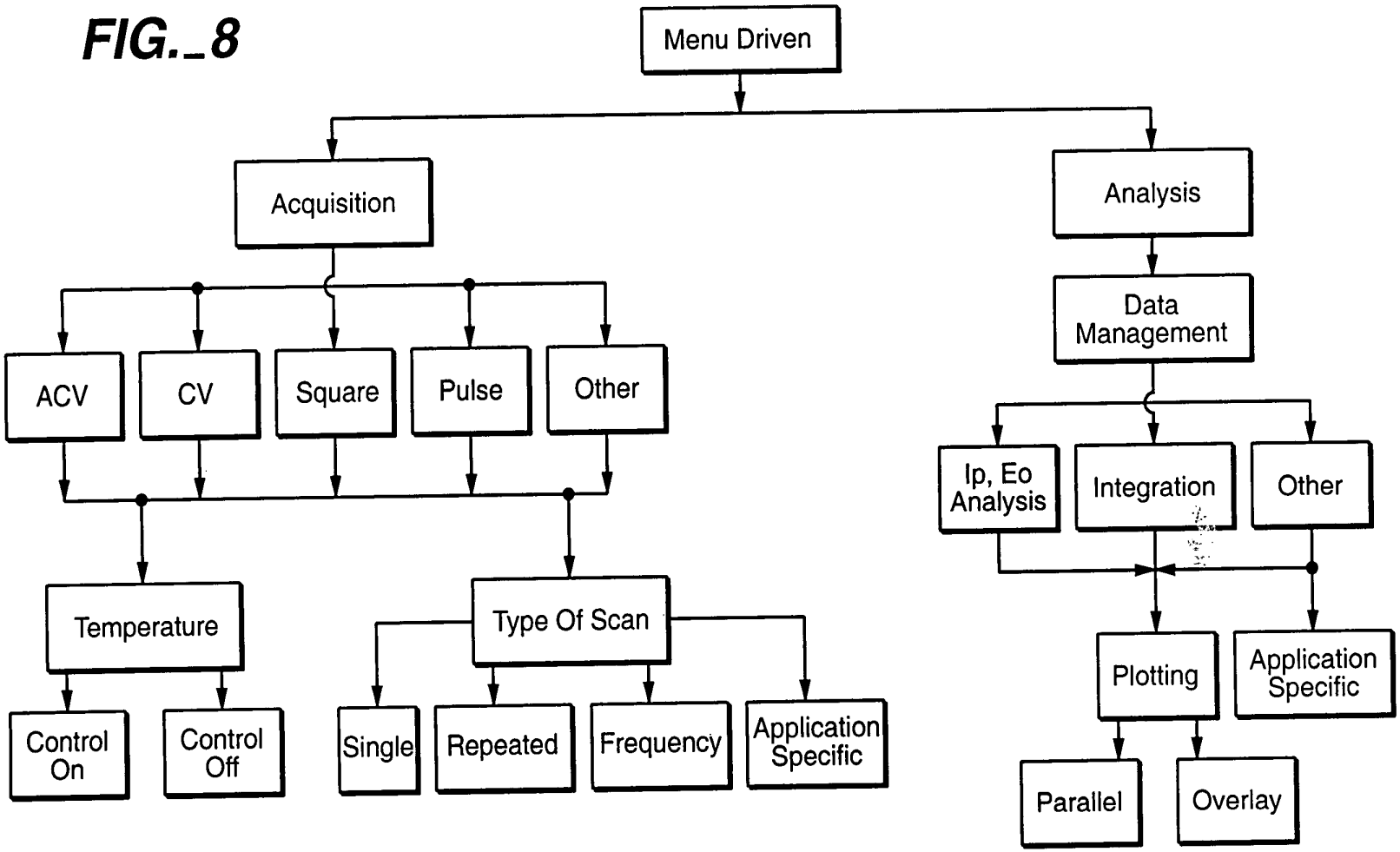


FIG._7

FOTF20" SZTH060

FIG._8



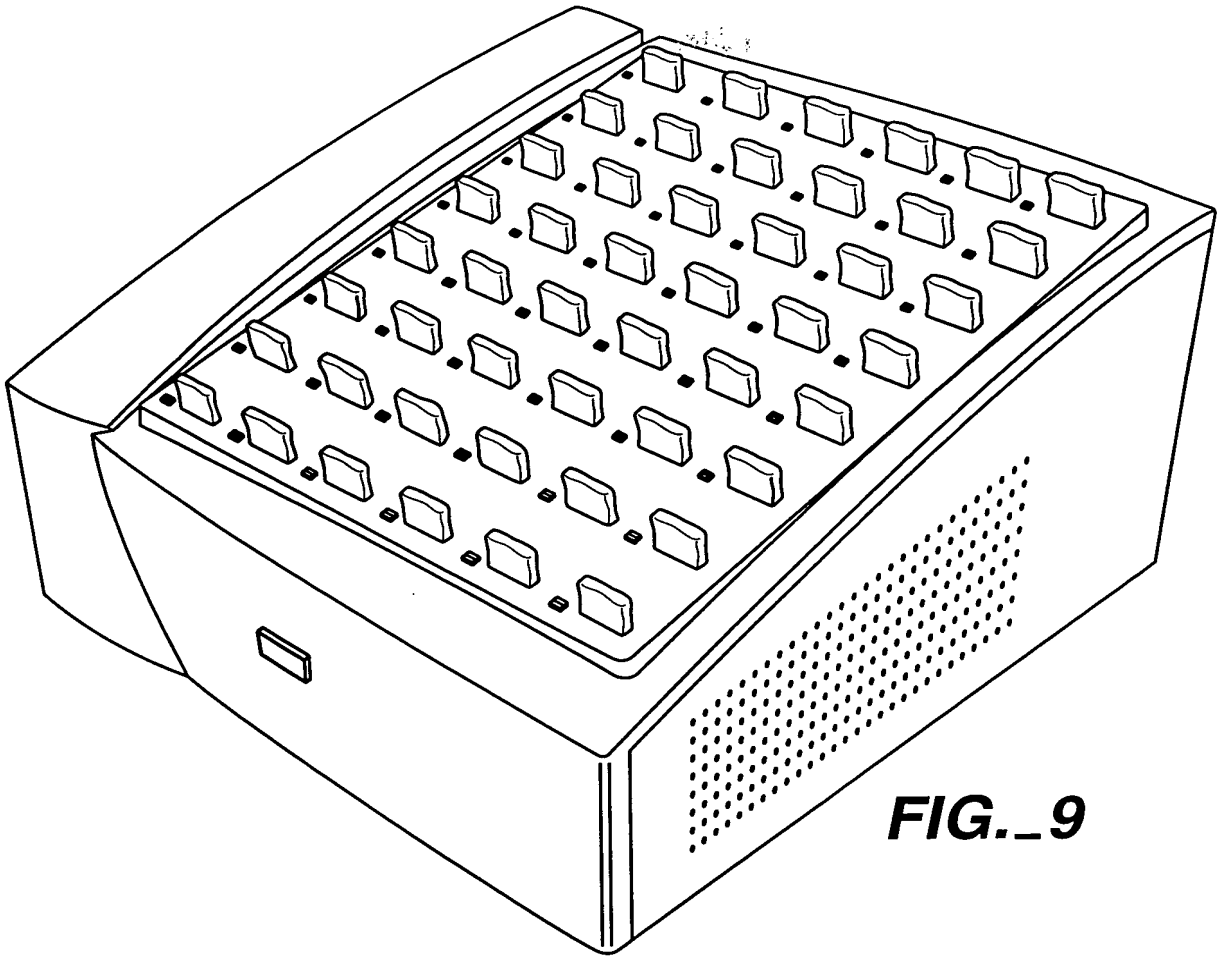


FIG._9

D00004795 070404

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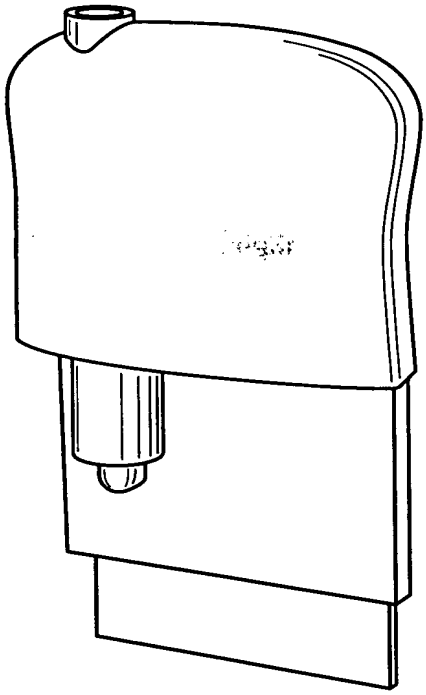


FIG._10A

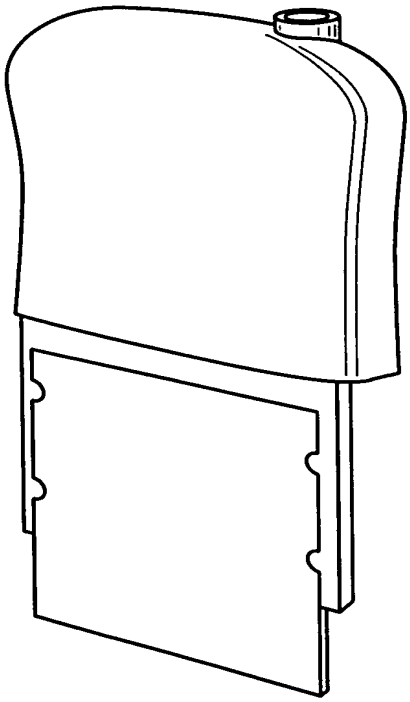


FIG._10B

- Bar coded "reference" sheet, stored in tray under unit, with bar coded protocols, bar coded well and slot id's, bar coded commands (e.g. "cancel", "done", etc.)
- Standard bar code wand (preferably with built-in decoder), housed in the tray (hence hidden when not in use)
- Serial (RS-232/485) interface (preferred), or "keyboard wedge"
- Multi-code support (Code 39, Code 128, etc.)
- Bar code on chip carrier (1 code per "8 pack"), identifying test, batch, etc.
  - Peel off labels, with same code as on carrier, with each "8 pack"

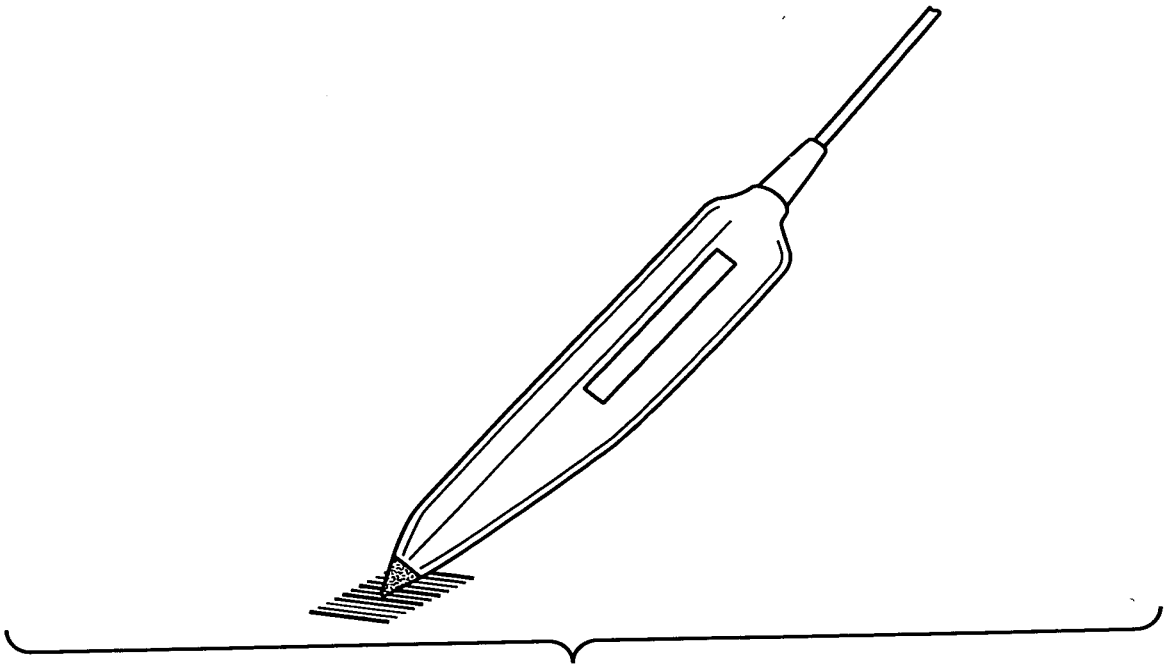


FIG._11

- Bar code usage scenario
  - User fills "8-pack" (all 8, or partially) from a 96 well plate, or from individual sample containers (PCR tubes, vaccutainers, etc.)
  - Pull out tray (with bar code reference sheet) and grab wand
  - Scan "start" code
  - Scan protocol code from sheet (will remain in effect until "done" is scanned)
  - Scan chip code from carrier (will remain in effect until "done" is scanned)
  - For each cartridge, user will
    - insert the cartridge in an open slot. Unit senses new chip automatically
    - scan the sample ID by either
      - scanning 96 well plate bar code from plate and well code from sheet
      - or scanning unique sample ID from container
      - or scanning "no ID" from reference sheet
  - Scan "done" code. The protocol can' now be started on these cartridges

FIG._12

- Bar code concept benefits
  - No keyboard entry (all-routine setup can be entered via bar coding)
  - All routine entries accomplished while in front of unit (no going back & forth between PC & Hydra)
  - All bar code entries done from small, flat surface in front of unit
  - No need to label each chip or each slot (which would compromise appearance)
  - Uses small unobtrusive bar code wand, hidden when not in use
  - Is flexible with respect to sample container (tube, 96 well plate, etc.), chip usage (by row of 8, or by individual chip), and lab bar coding method

FIG._13

FIG._14A

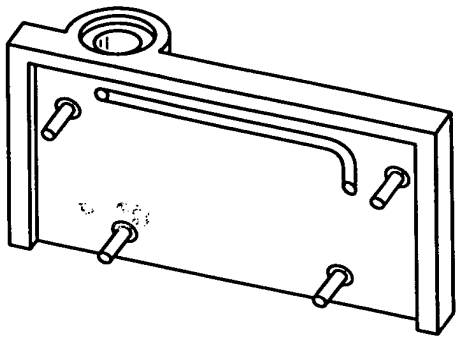


FIG._14B

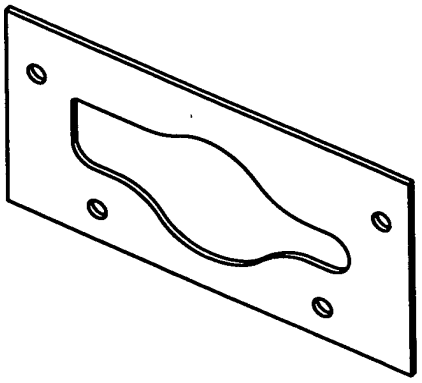


FIG._14C

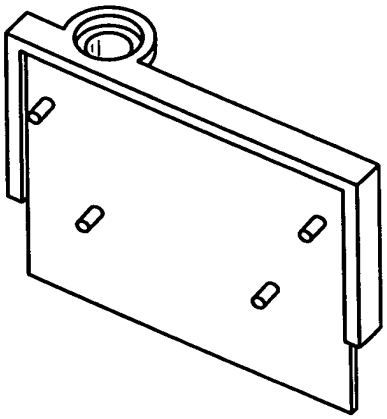
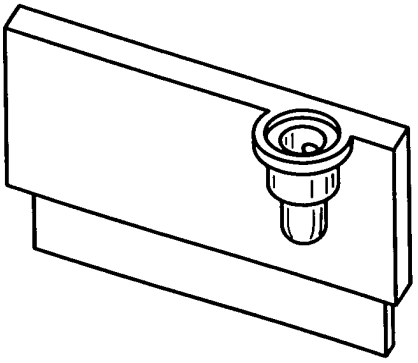


FIG._14D



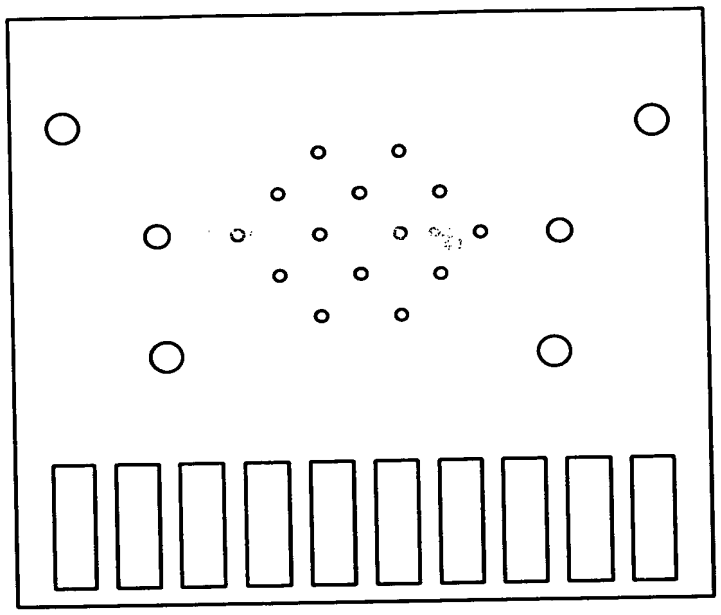


FIG._14E

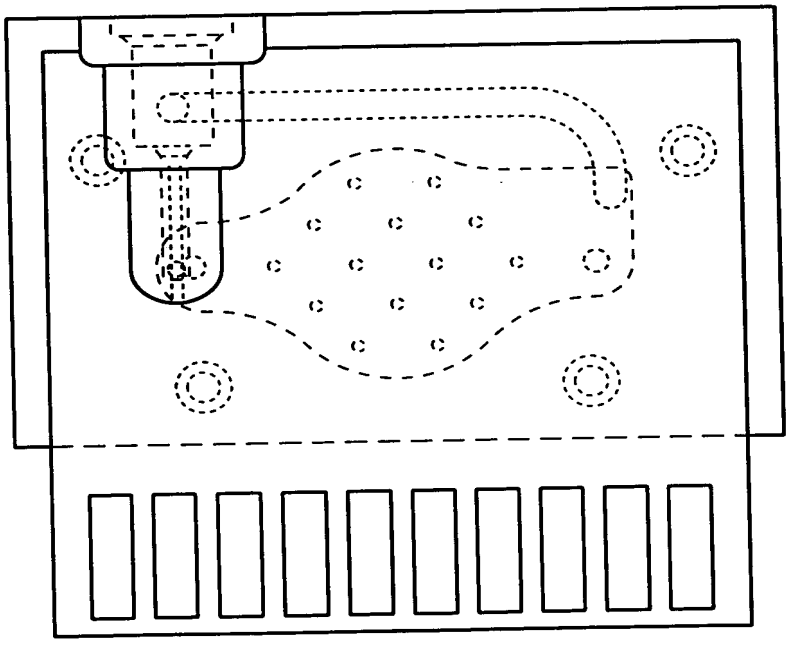


FIG._14F

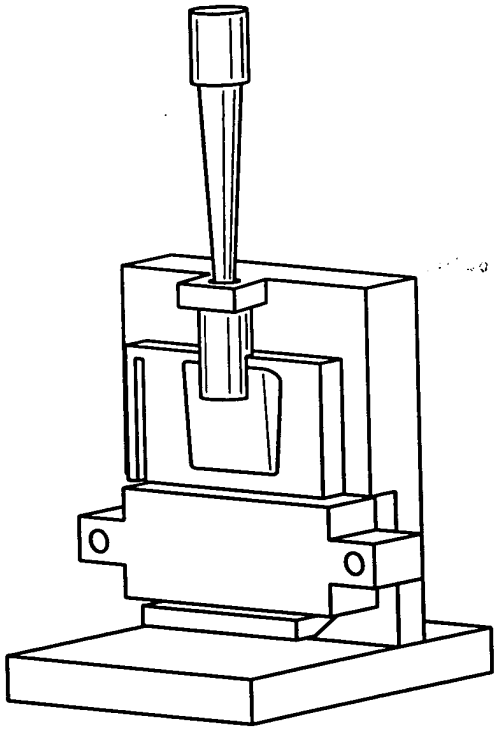


FIG._15A

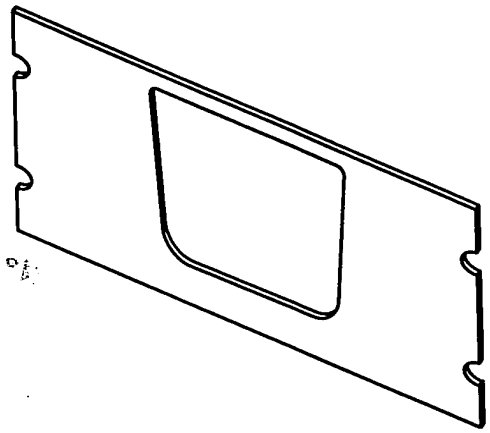


FIG._15B

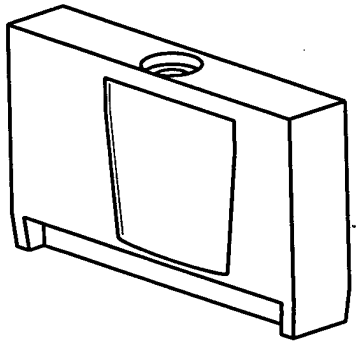


FIG._15C

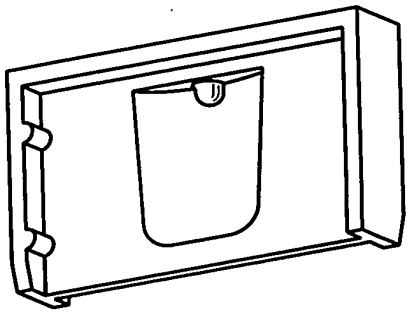


FIG._15D

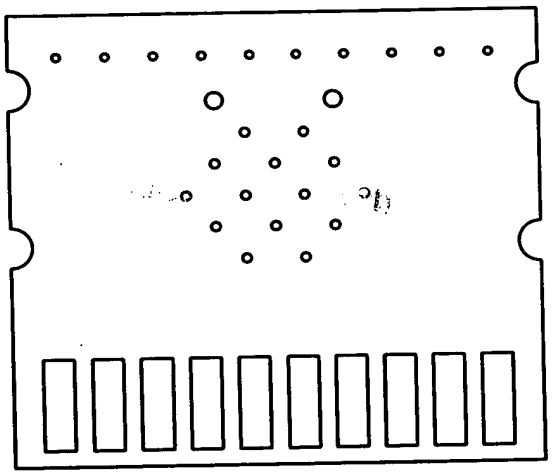


FIG._15E

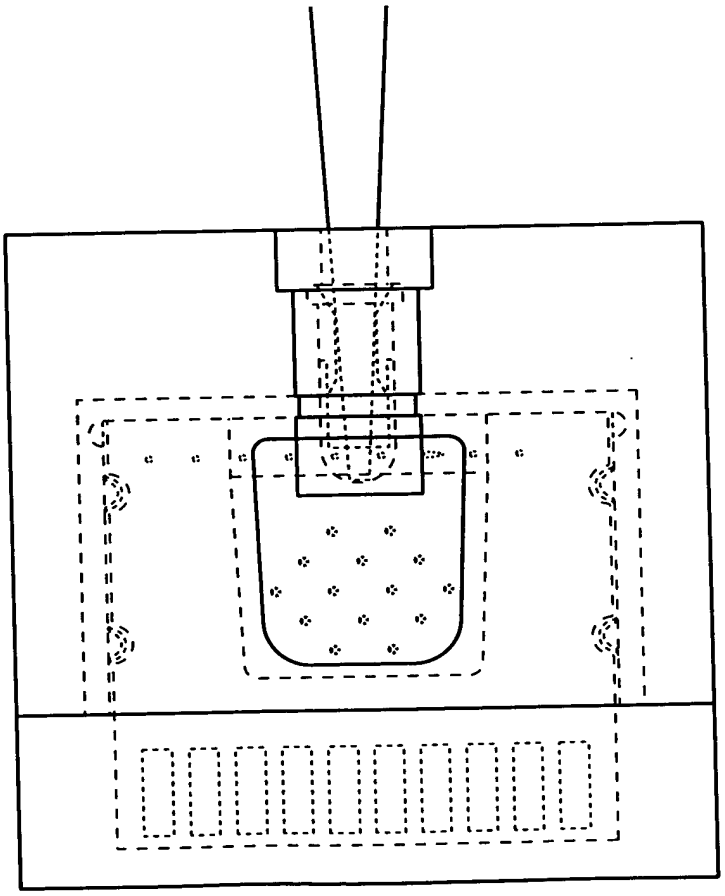


FIG._15F

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A Sine Wave And Its Corresponding Vector Notation

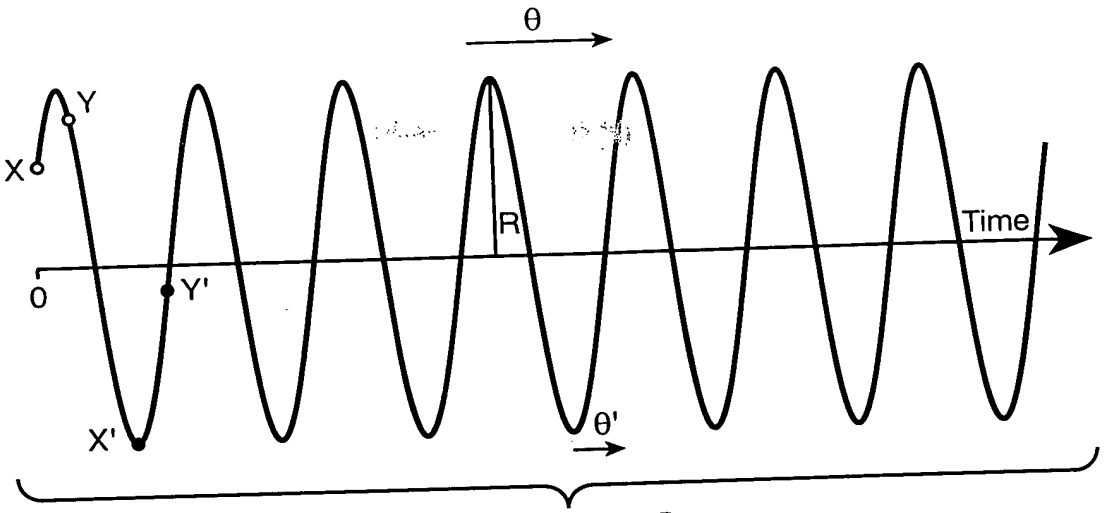

FIG._16

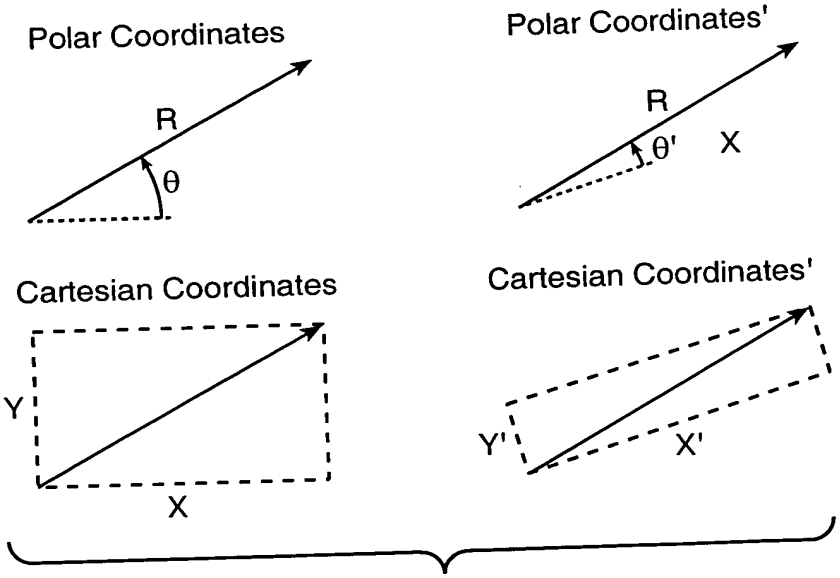

FIG._17

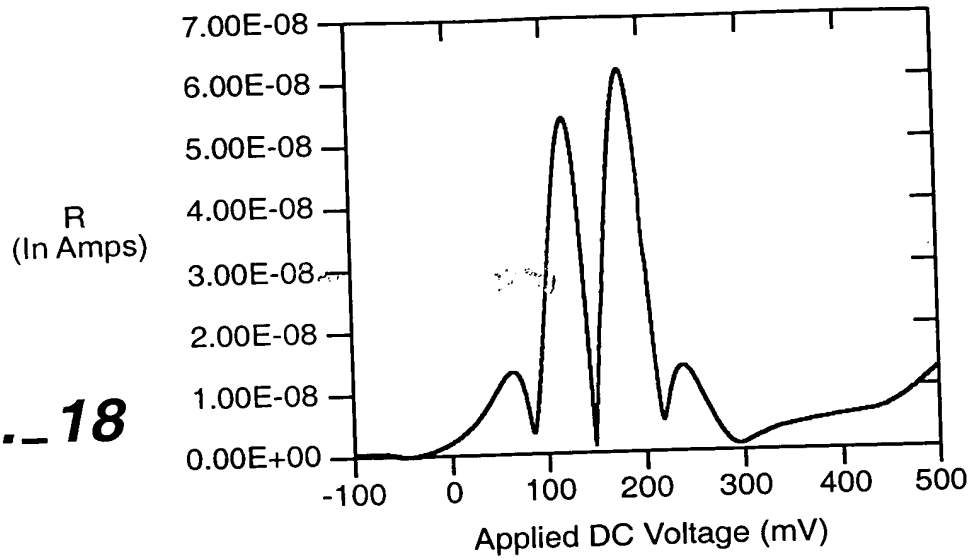

FIG._18

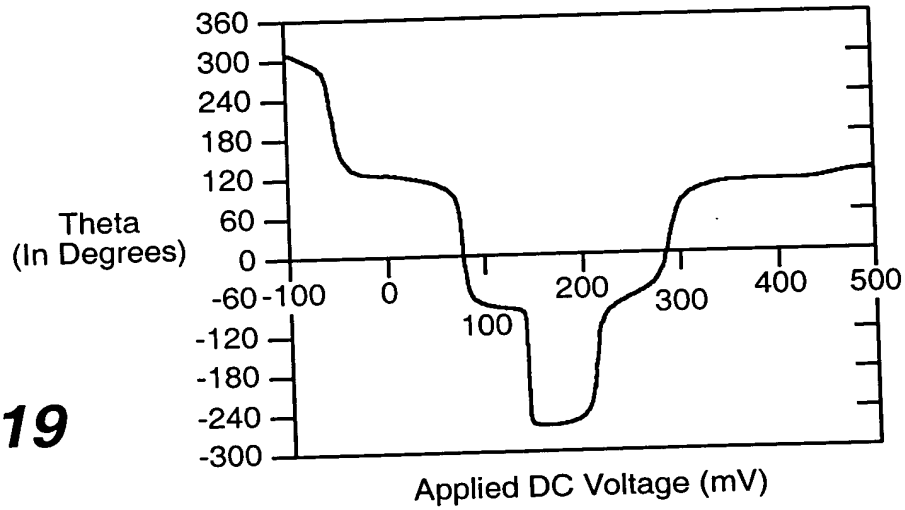

FIG._19

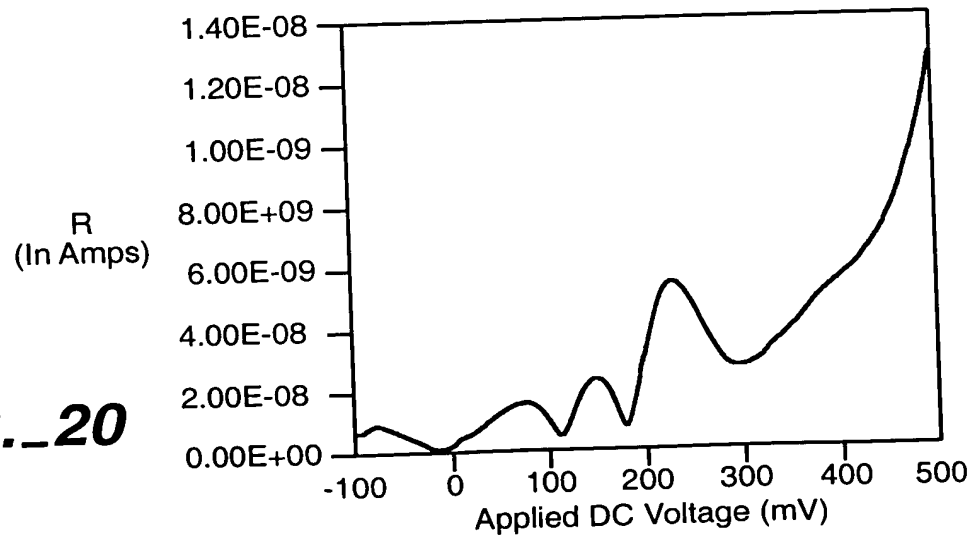

FIG._20

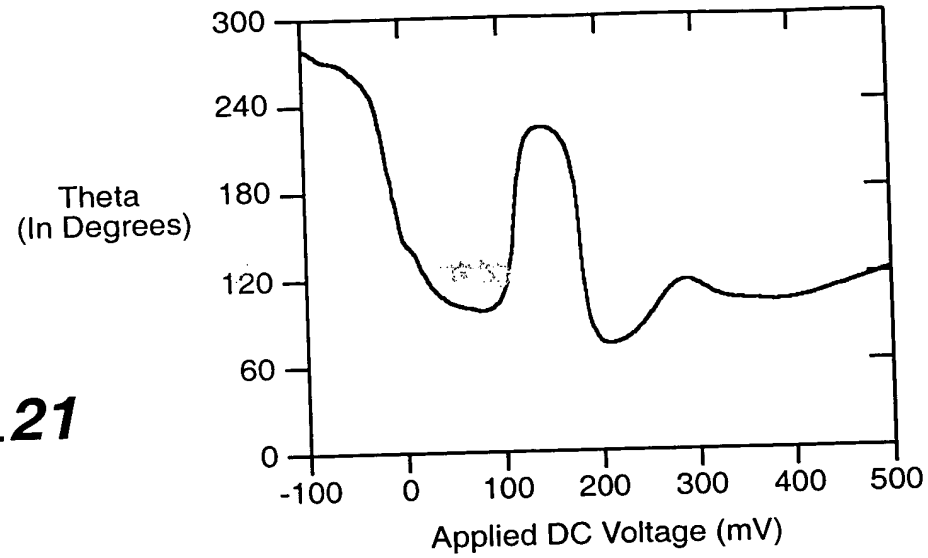

FIG._21

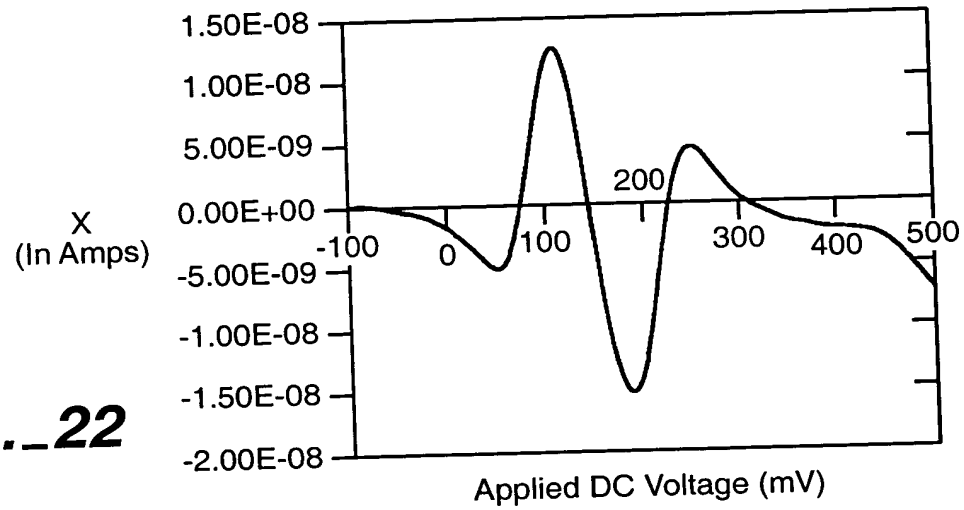

FIG._22

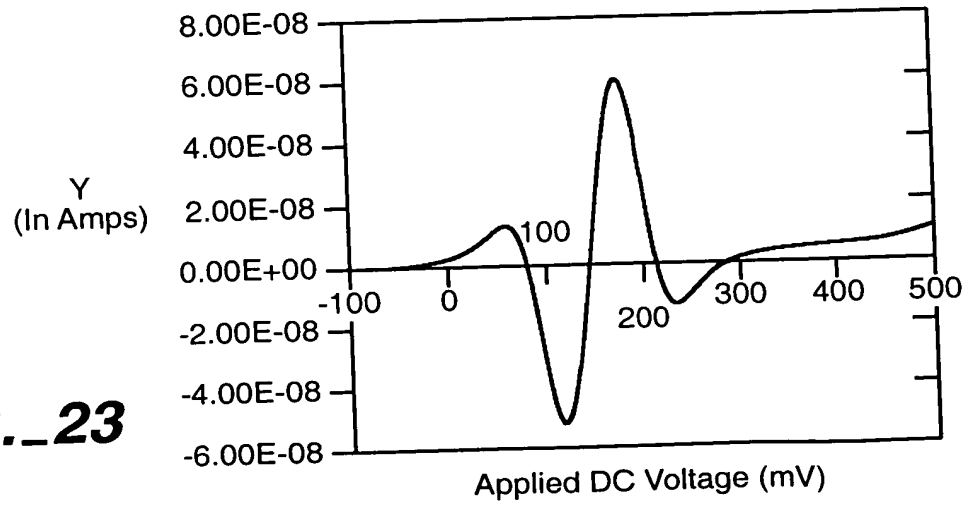

FIG._23

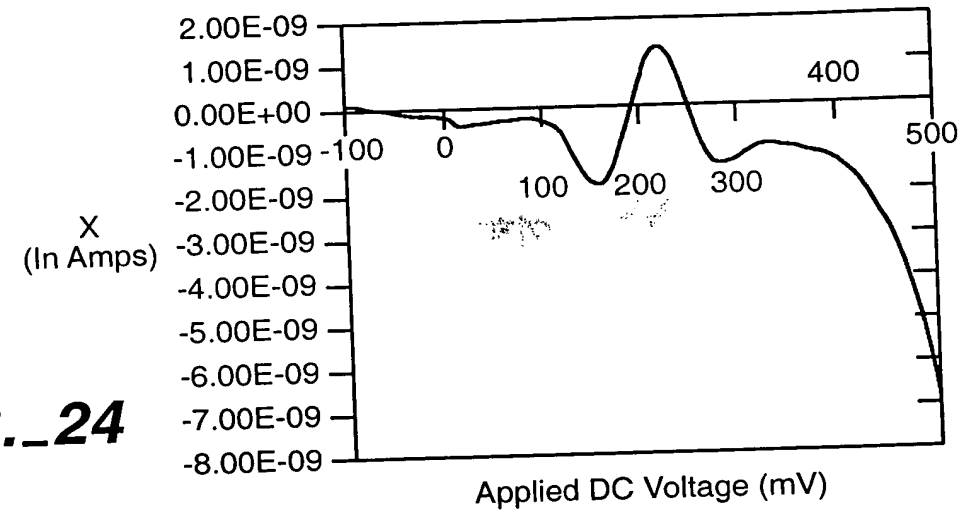

FIG._24

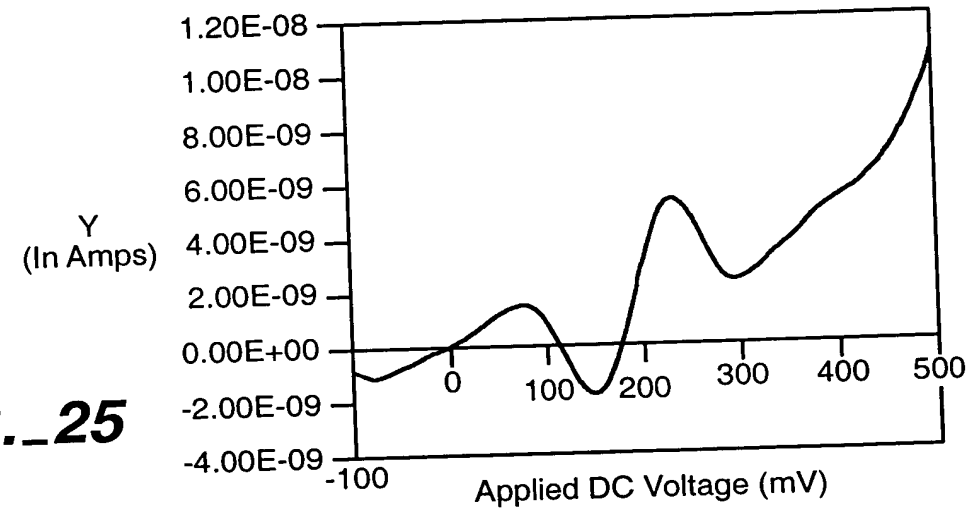

FIG._25

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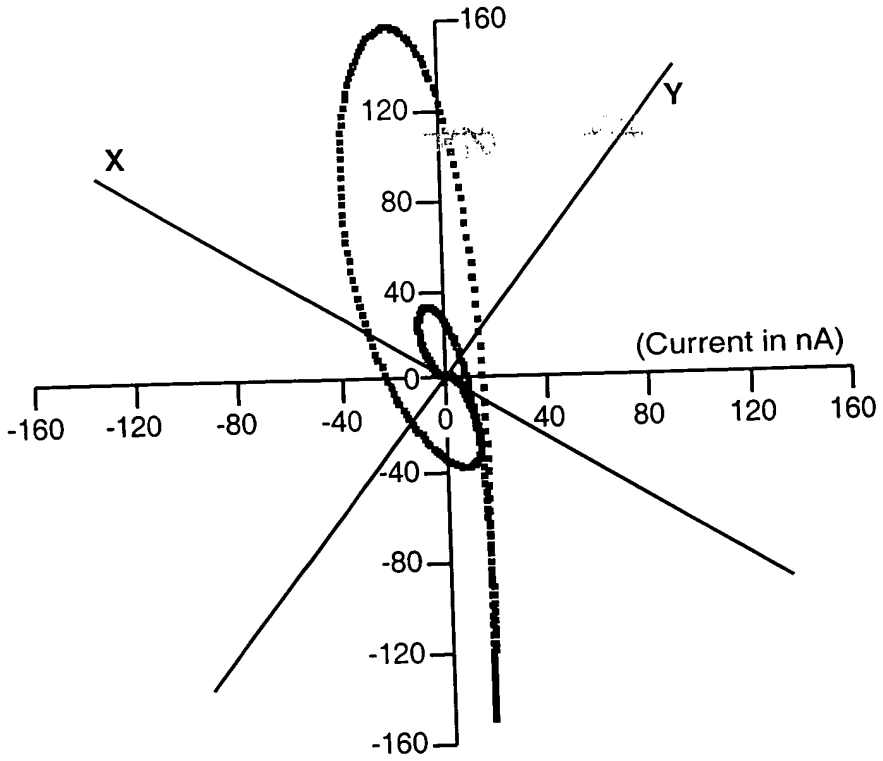

FIG._26

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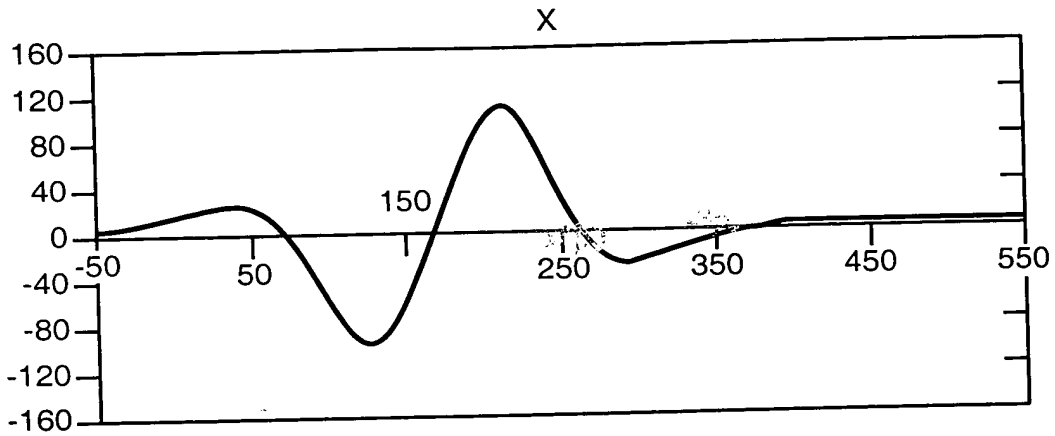


FIG._27

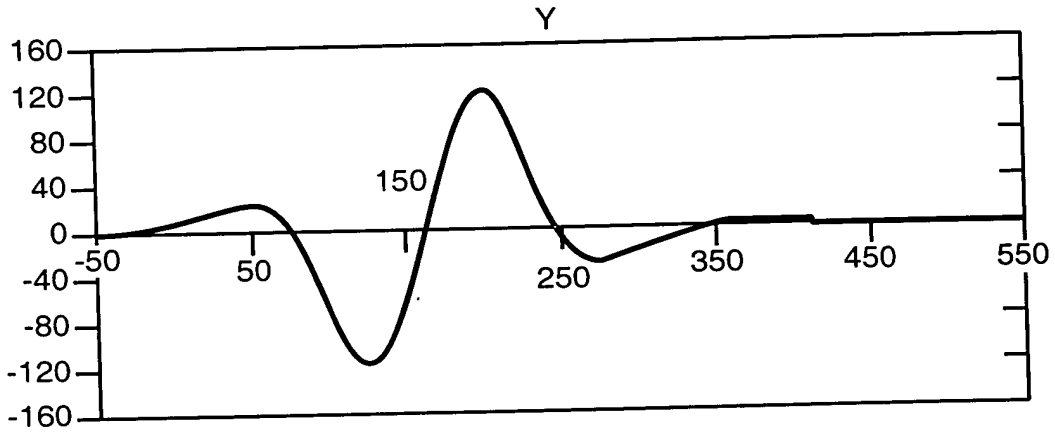


FIG._28

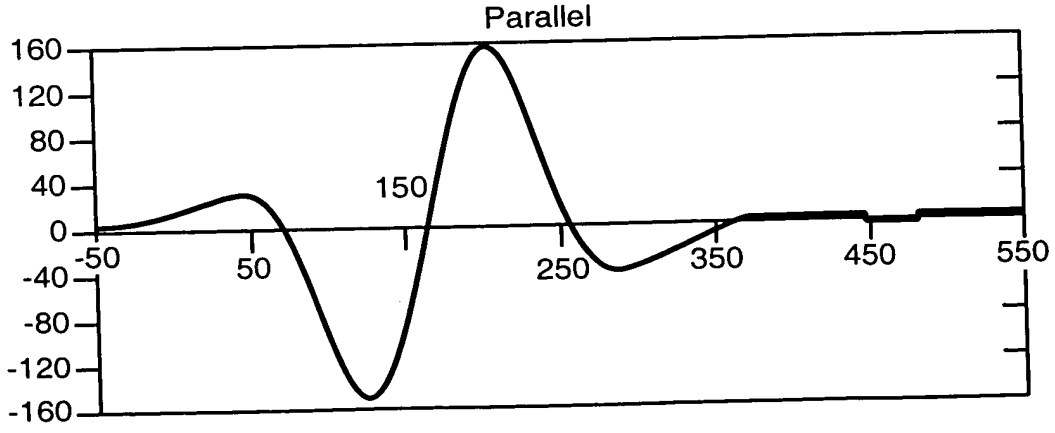


FIG._29

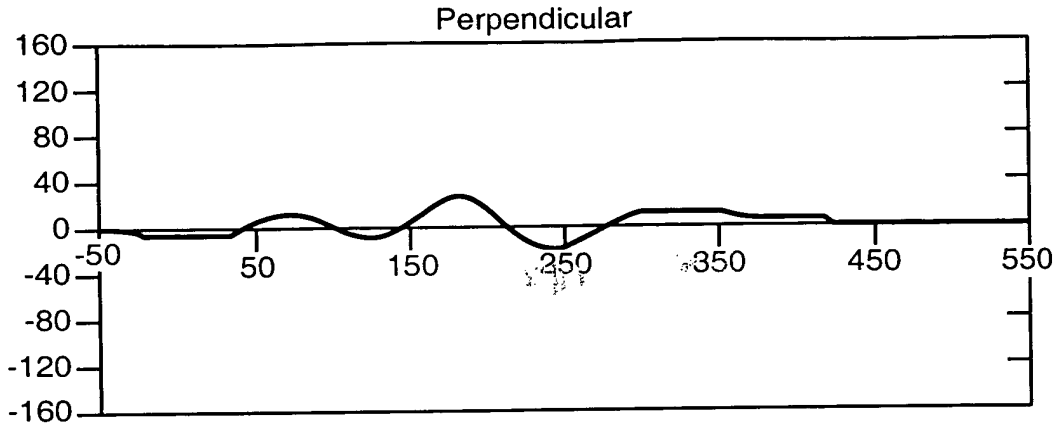


FIG._30

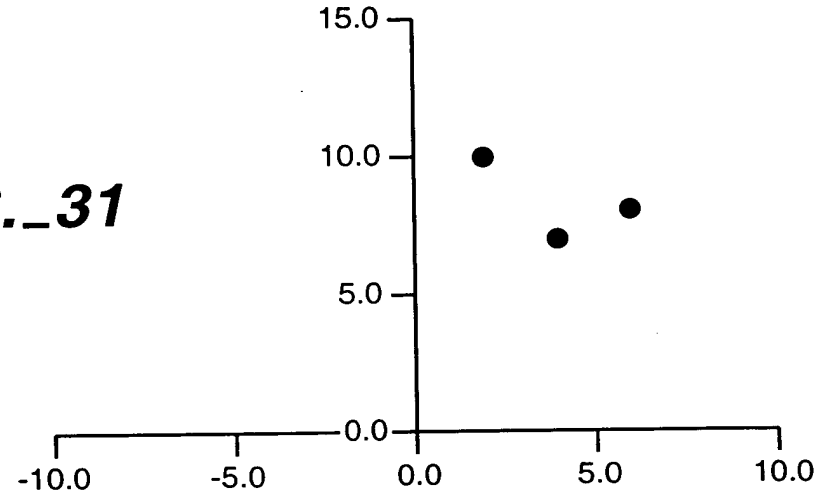


FIG._31

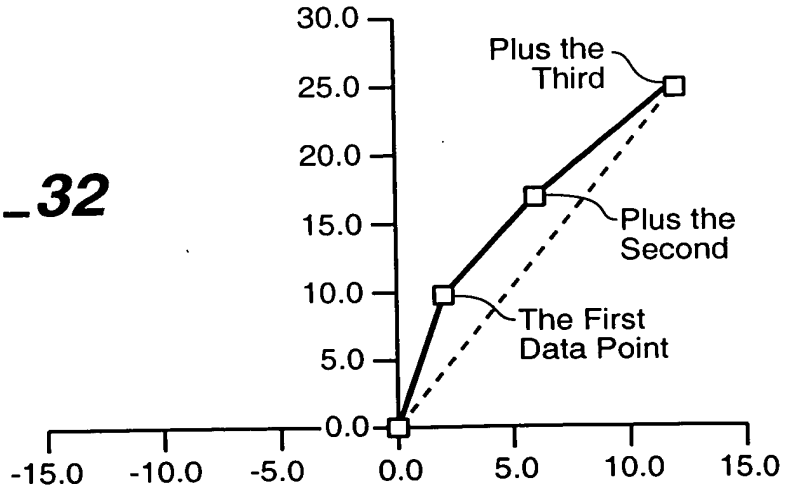


FIG._32

FIG._33

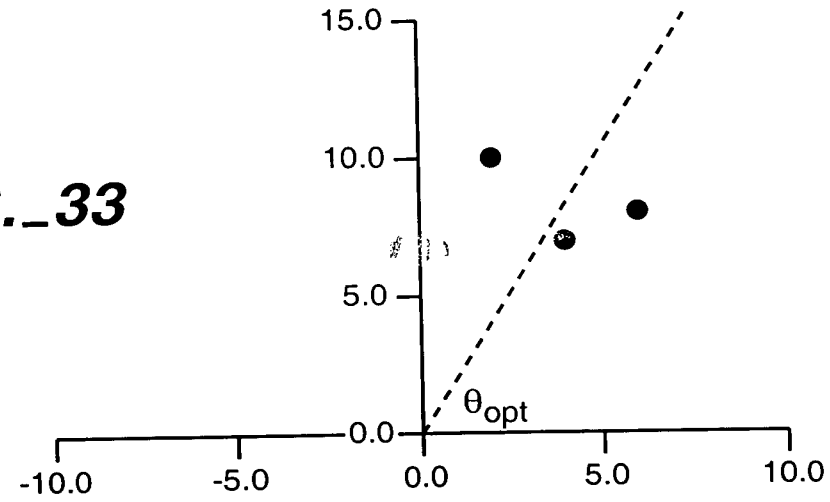


FIG._34

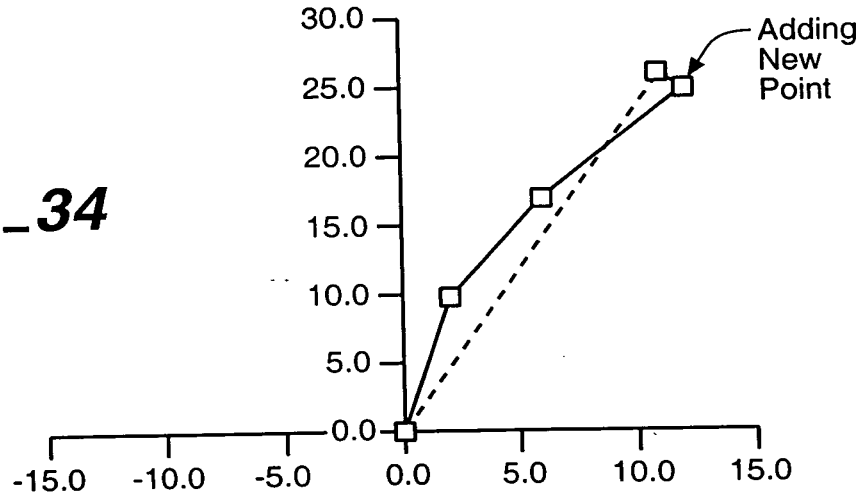
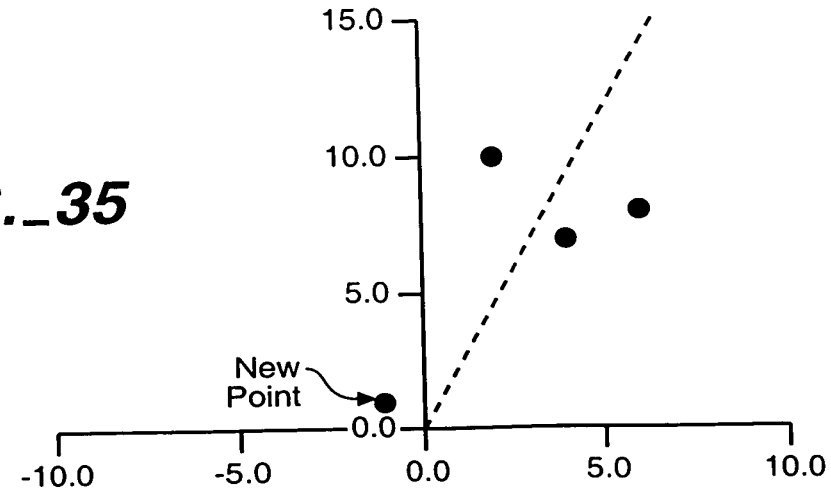


FIG._35



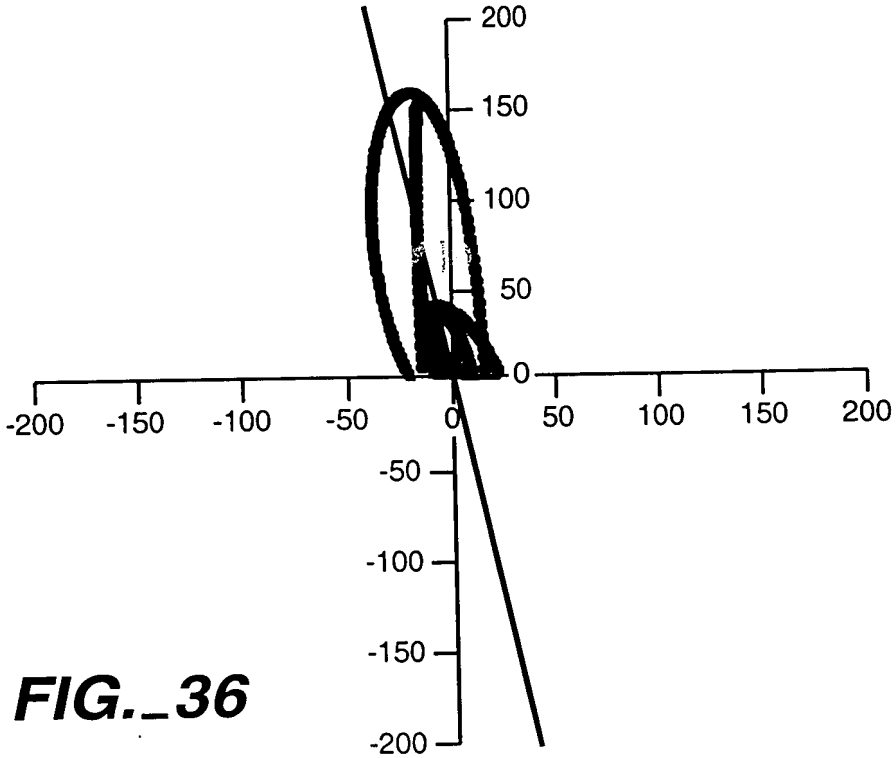

200
150
100
50
0
-200
-150
-100
-50
0
50
100
150
200
-50
-100
-150
-200

FIG._36

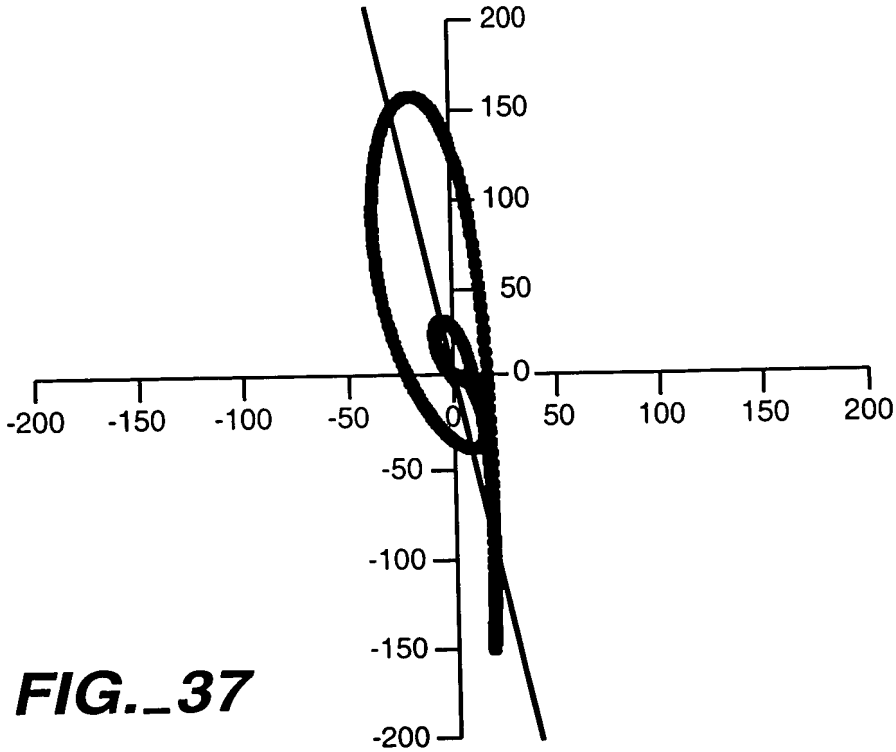

200
150
100
50
0
-200
-150
-100
-50
0
50
100
150
200
-50
-100
-150
-200

FIG._37

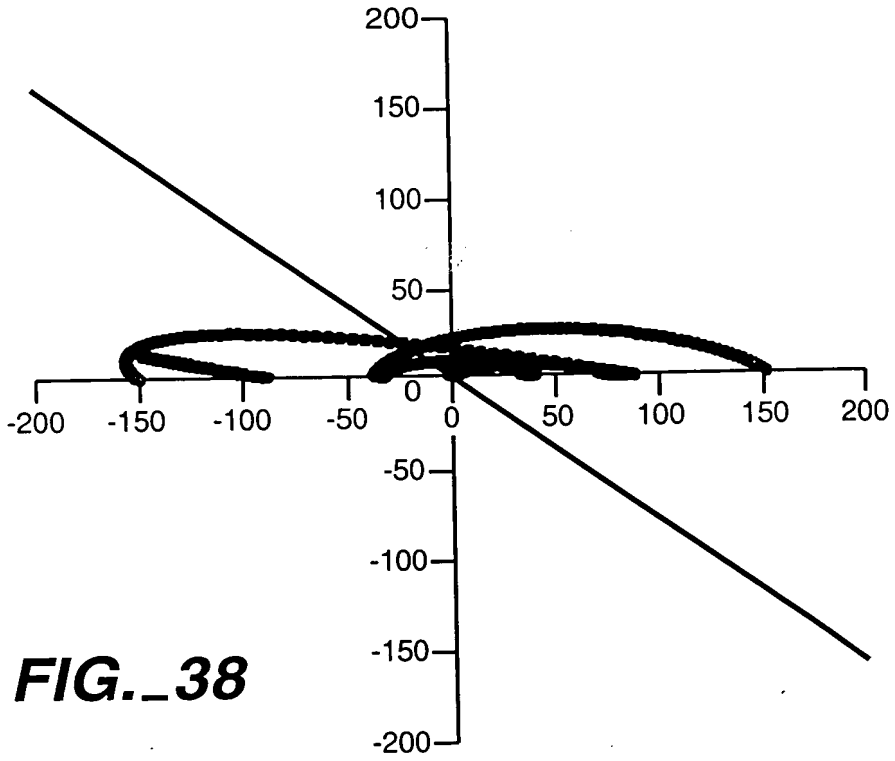

200
150
100
50
-200
-150
-100
-50
0
0
50
100
150
200
-50
-100
-150
-200

FIG._38

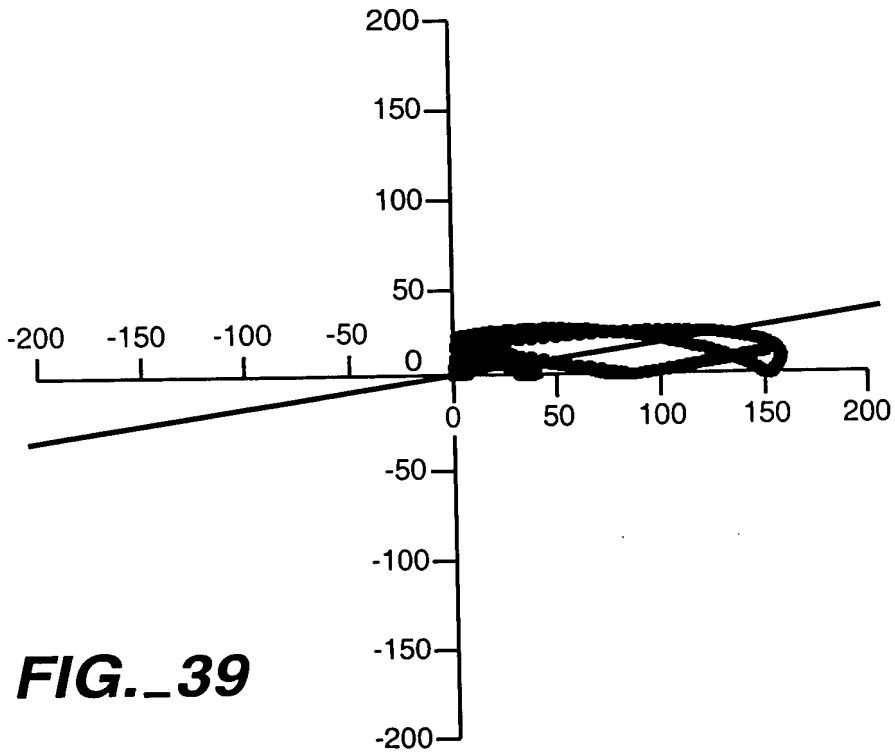

200
150
100
50
-200
-150
-100
-50
0
0
50
100
150
200
-50
-100
-150
-200

FIG._39

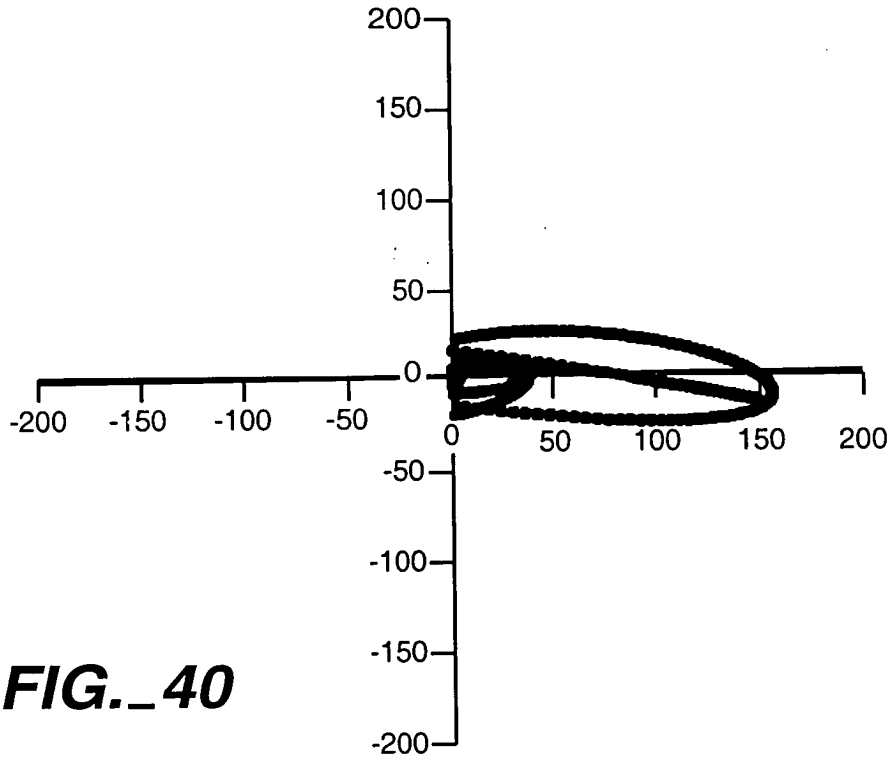


FIG._40

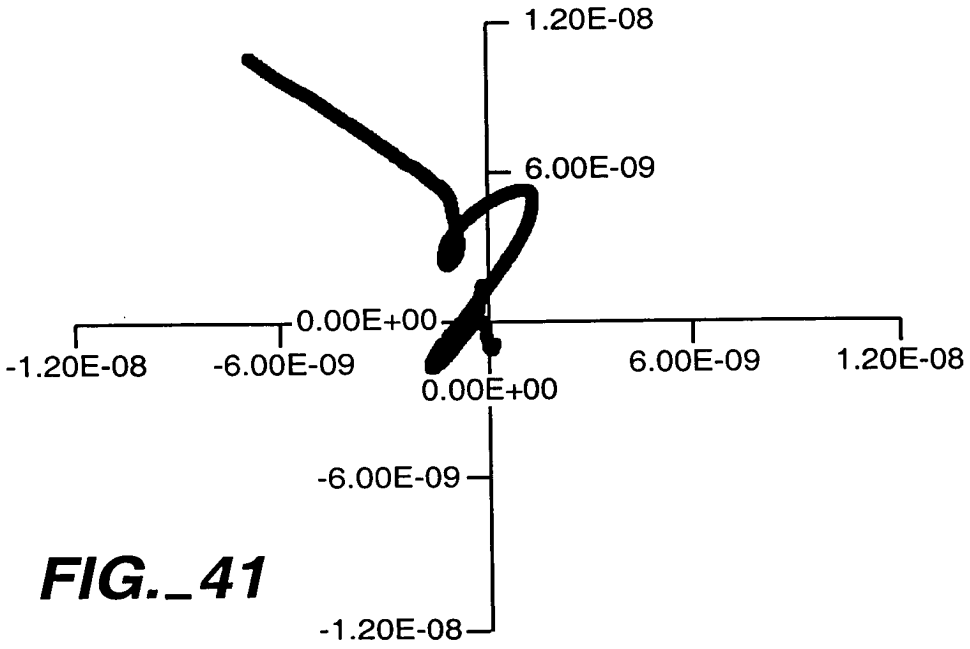
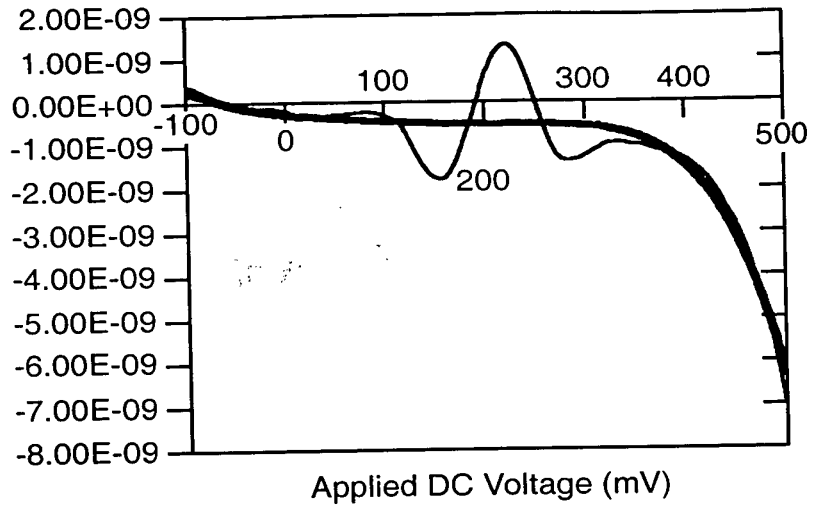


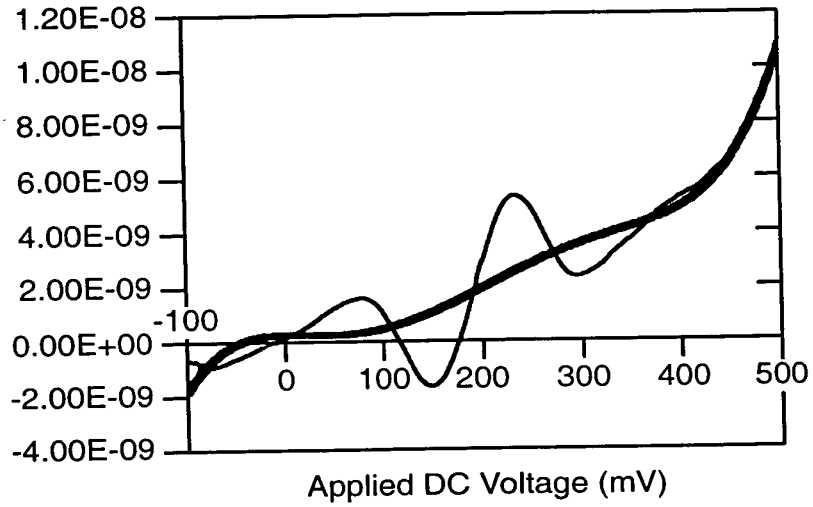
FIG._41

Sheet 5 of 5 Fig. 40 Fig. 41



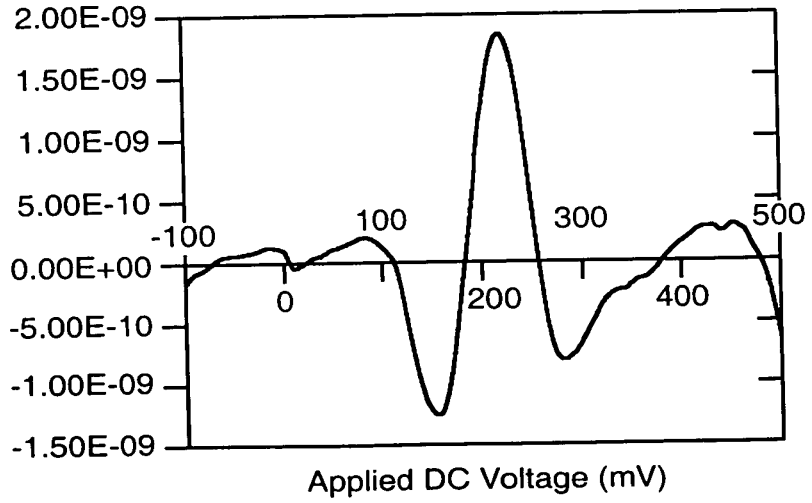
Scan Viewed Along 0 Degrees

FIG._42



Scan Viewed Along 0 Degrees

FIG._43



0 Deg. - 5th Order Polynomial

FIG._44

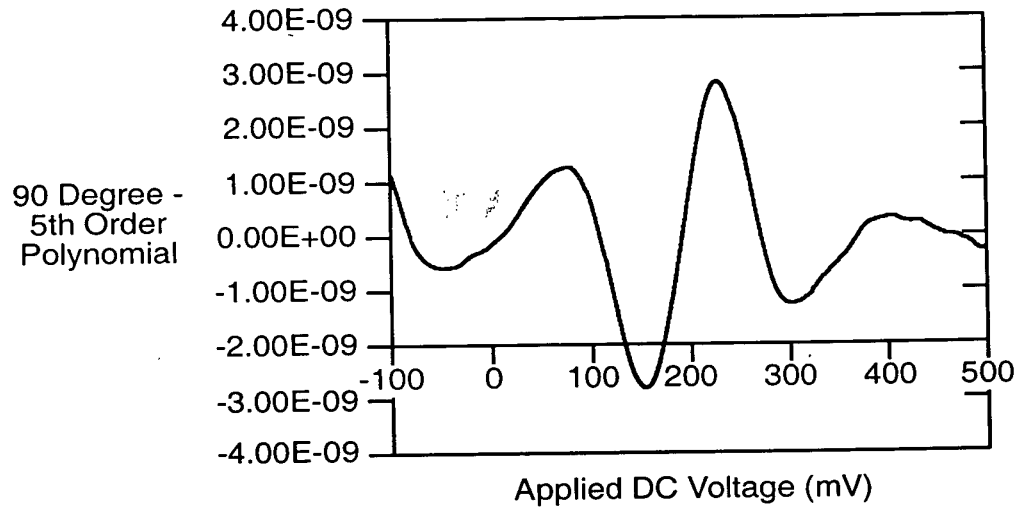

90 Degree - 5th Order Polynomial
4.00E-09
3.00E-09
2.00E-09
1.00E-09
0.00E+00
-1.00E-09
-2.00E-09
-3.00E-09
-4.00E-09
-100
0
100
200
300
400
500
Applied DC Voltage (mV)

FIG._45

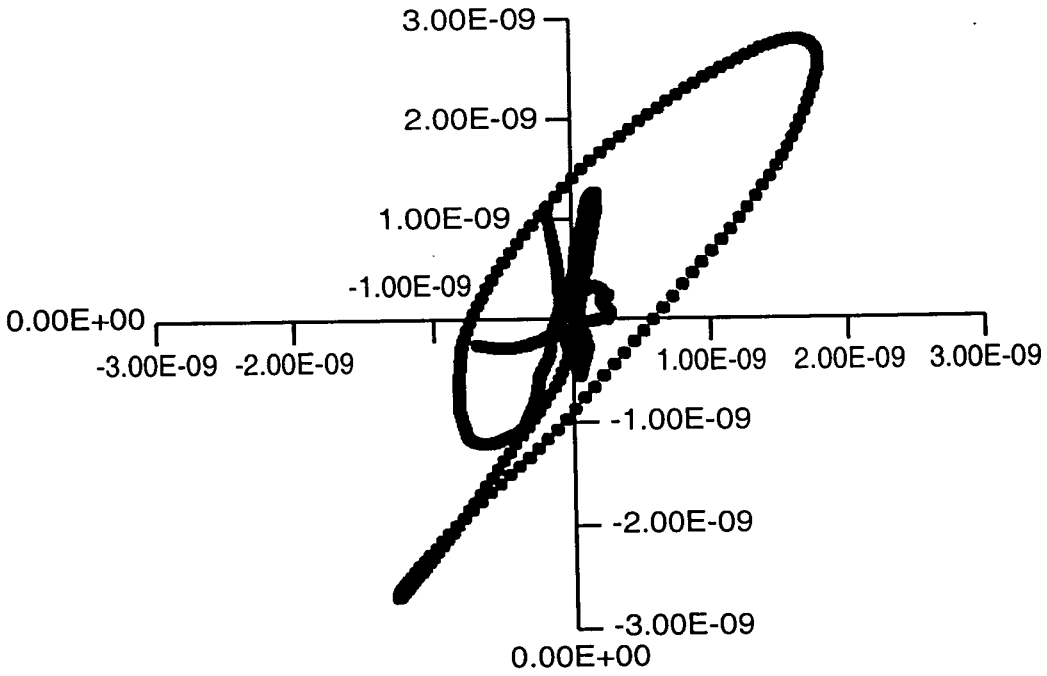

3.00E-09
2.00E-09
1.00E-09
-1.00E-09
0.00E+00
-3.00E-09
-2.00E-09
1.00E-09
2.00E-09
3.00E-09
-1.00E-09
-2.00E-09
-3.00E-09
0.00E+00

FIG._46

T0TT20" SZTH0660

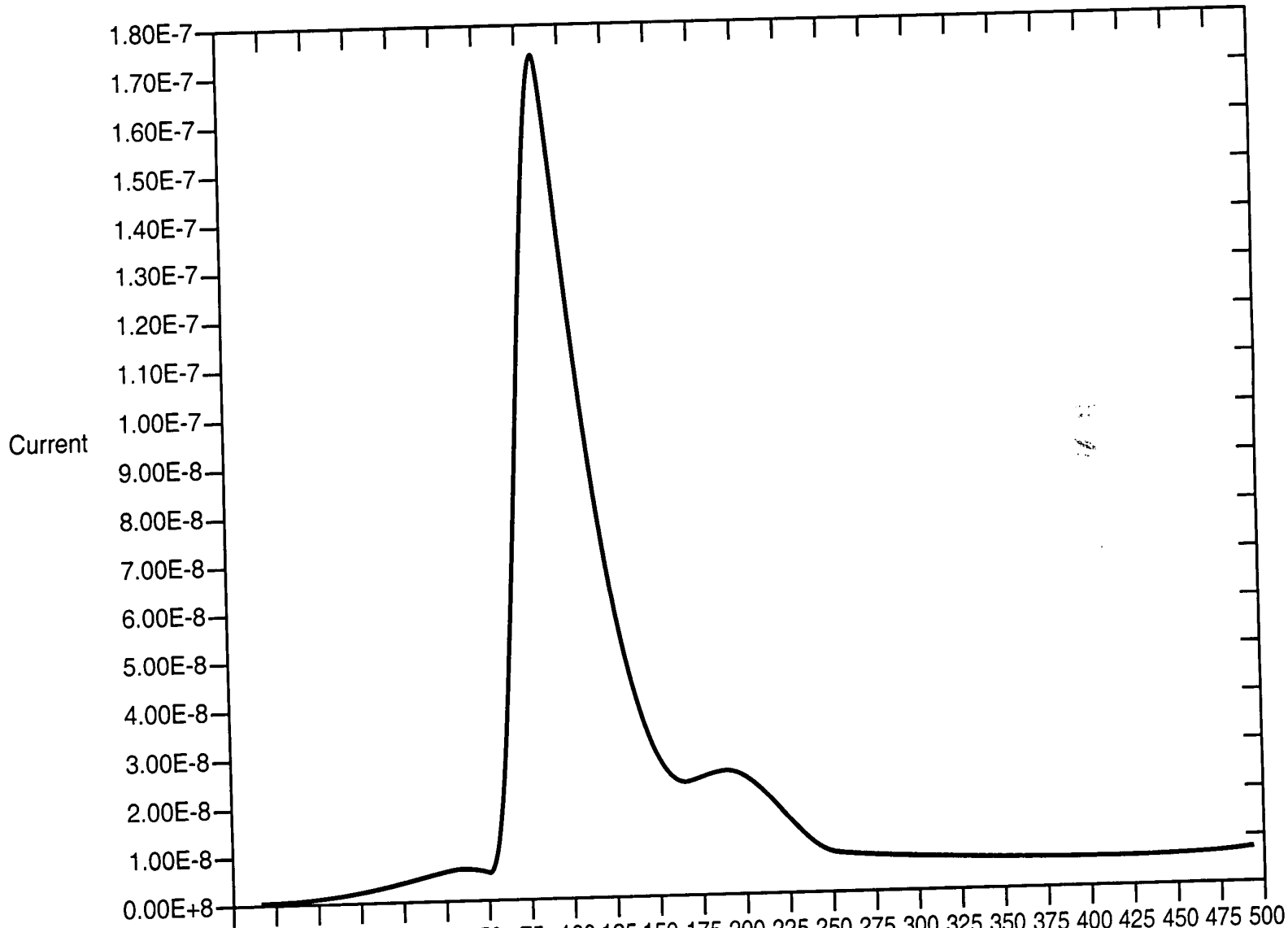


FIG._47

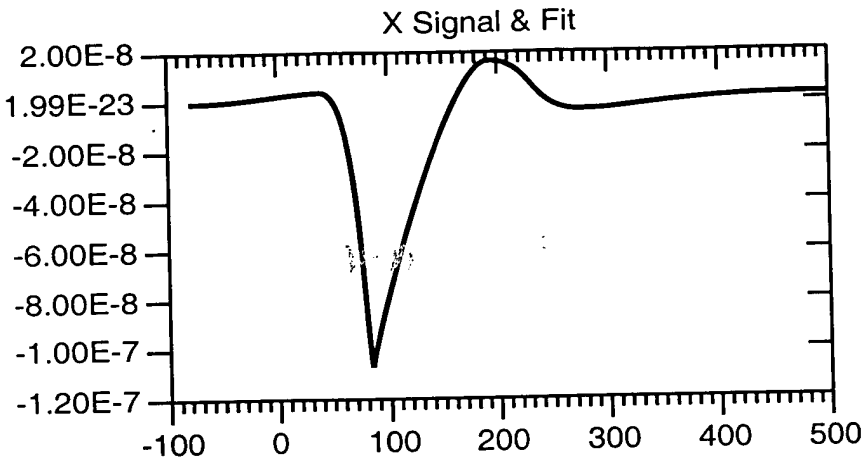


FIG._48

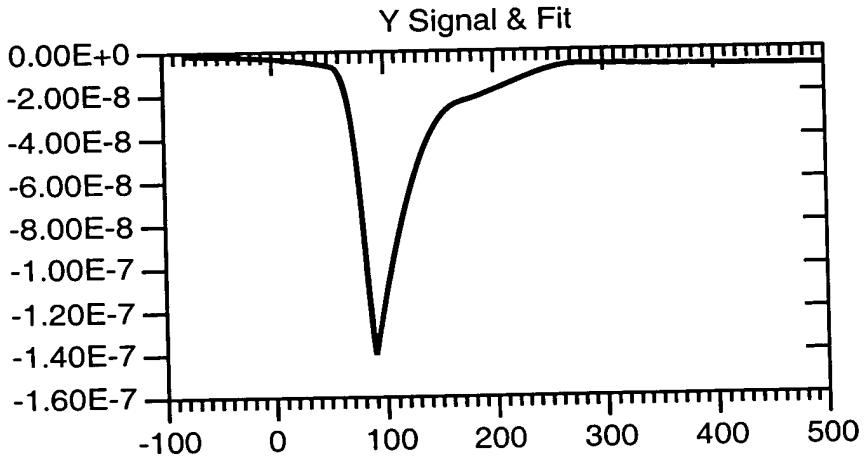


FIG._49

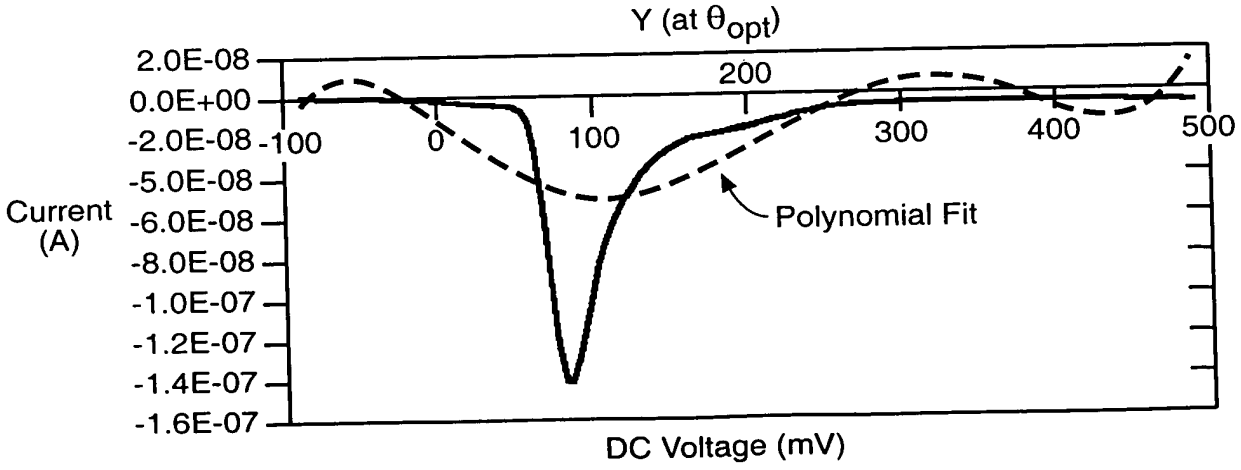


FIG._50

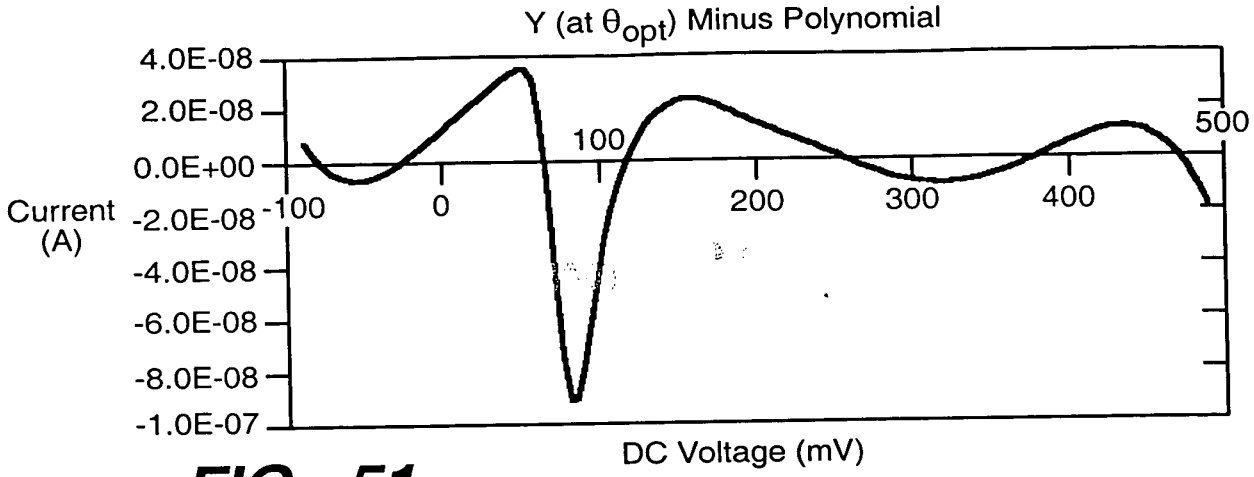

Y (at θ_{opt}) Minus Polynomial
4.0E-08
2.0E-08
0.0E+00
-2.0E-08
-4.0E-08
-6.0E-08
-8.0E-08
-1.0E-07
Current (A)
-100
0
100
200
300
400
500
DC Voltage (mV)

FIG._51

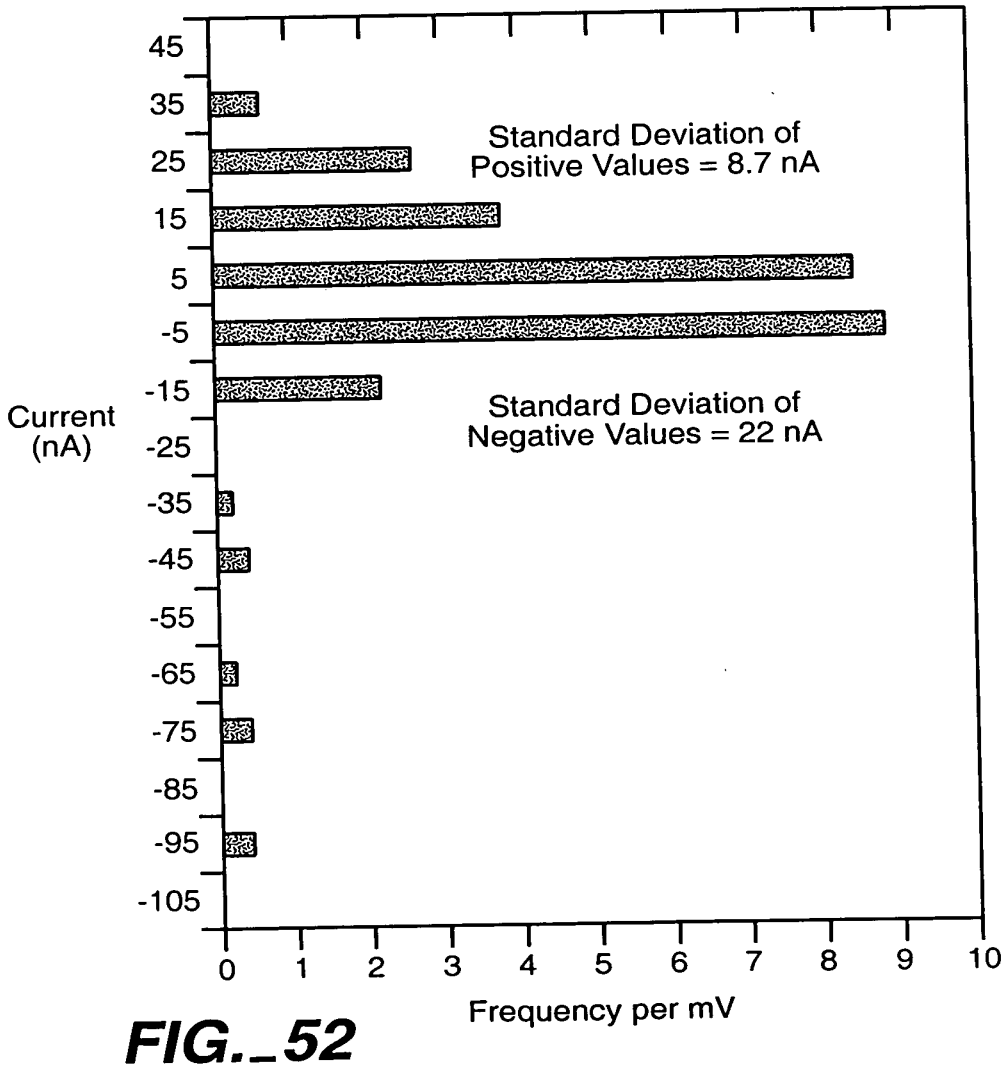

45
35
25
15
5
-5
-15
-25
-35
-45
-55
-65
-75
-85
-95
-105
Current (nA)
Standard Deviation of Positive Values = 8.7 nA
Standard Deviation of Negative Values = 22 nA
0
1
2
3
4
5
6
7
8
9
10
Frequency per mV

FIG._52

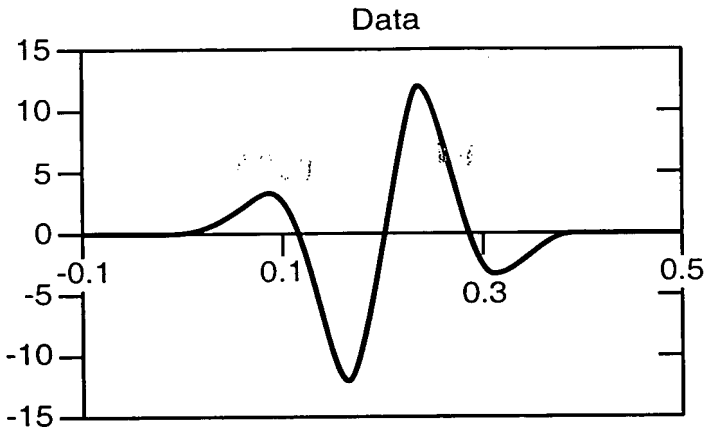

Data
15
10
5
0
-5
-10
-15
-0.1
0.1
0.3
0.5

FIG._53

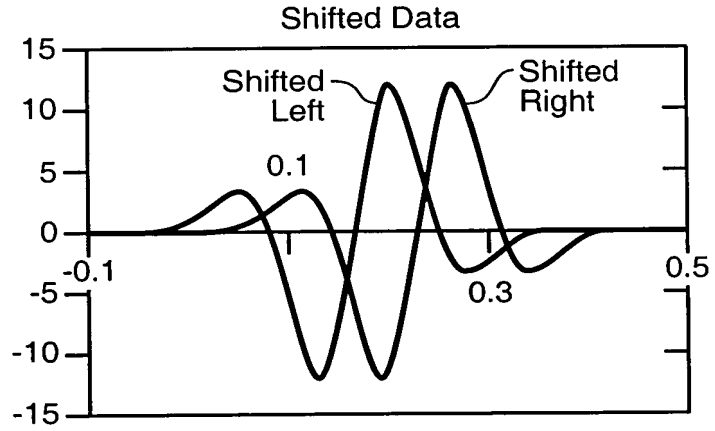

Shifted Data
15
10
5
0
-5
-10
-15
Shifted Left
Shifted Right
0.1
-0.1
0.3
0.5

FIG._54

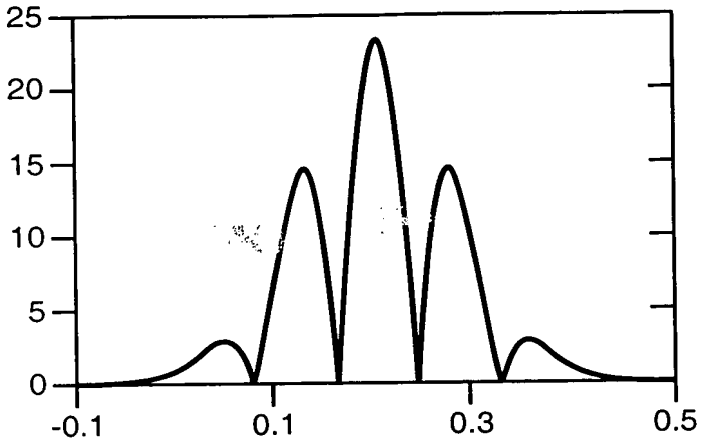


FIG._55

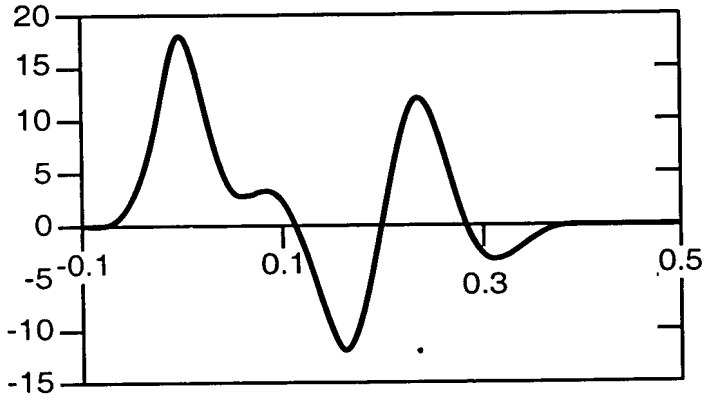


FIG._56

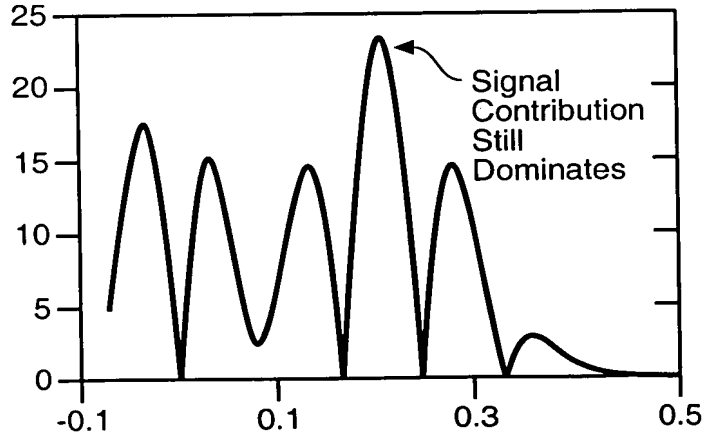


FIG._57

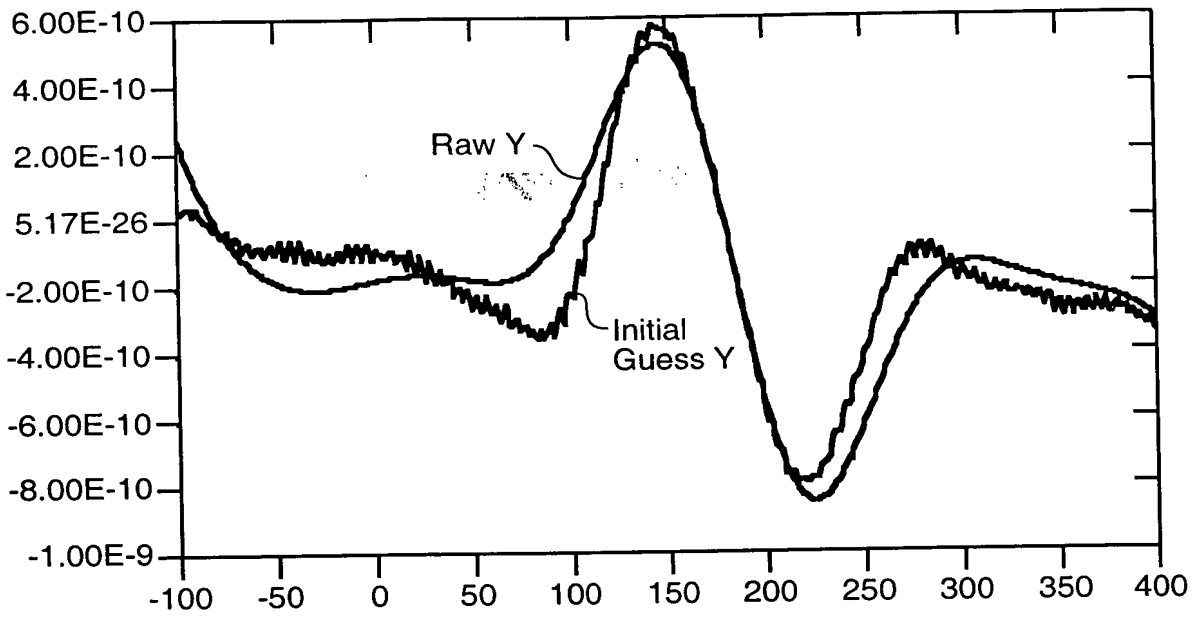

6.00E-10
4.00E-10
2.00E-10
5.17E-26
-2.00E-10
-4.00E-10
-6.00E-10
-8.00E-10
-1.00E-9
Raw Y
Initial
Guess Y
-100
-50
0
50
100
150
200
250
300
350
400

FIG._58

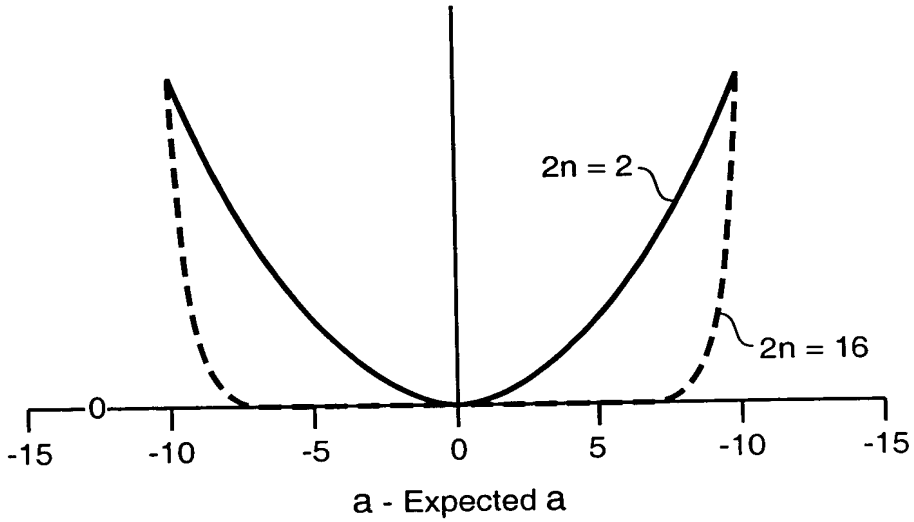

2n = 2
2n = 16
0
-15
-10
-5
0
5
-10
-15
a - Expected a

FIG._59

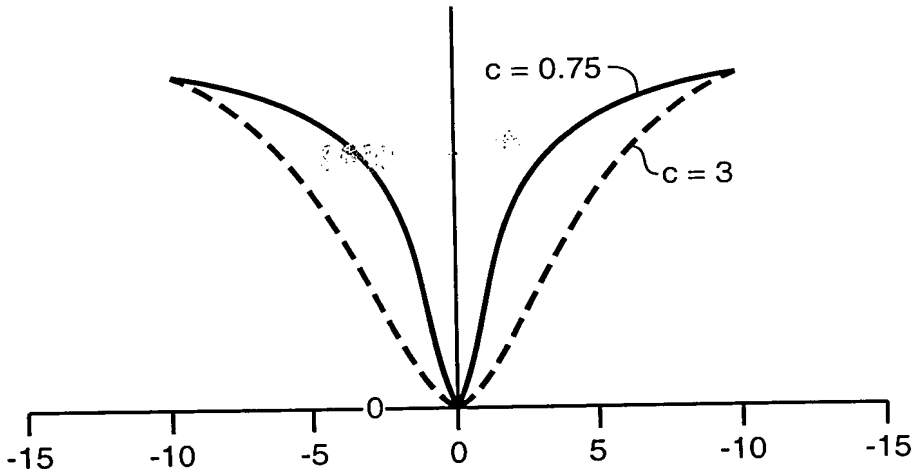

c = 0.75
c = 3
0
-15
-10
-5
0
5
-10
-15
a - Expected a

FIG._60

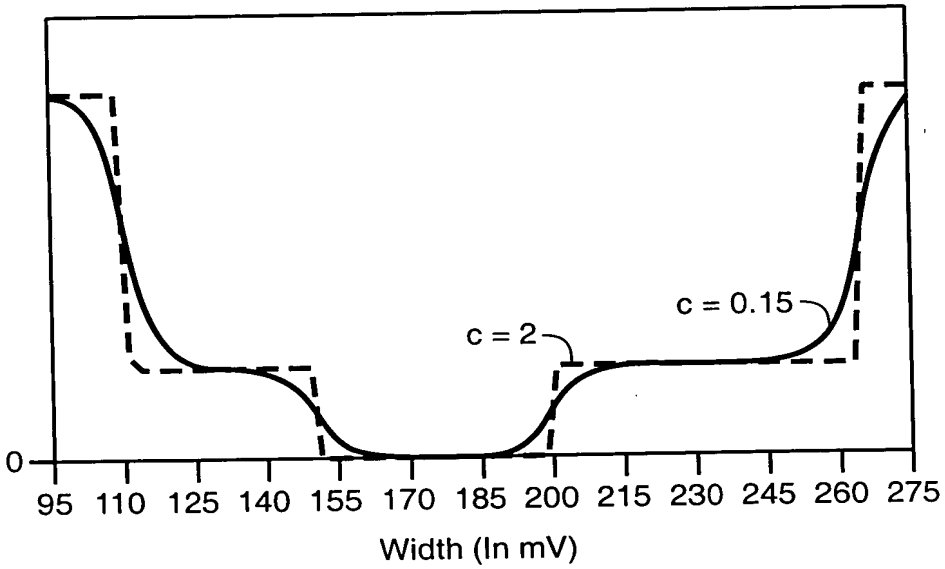

c = 0.15
c = 2
0
95
110
125
140
155
170
185
200
215
230
245
260
275
Width (In mV)

FIG._61

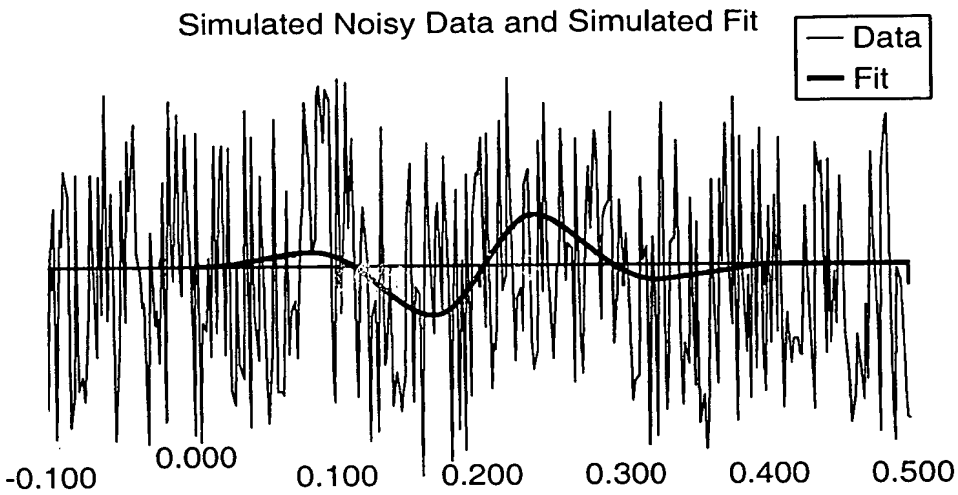


FIG._62

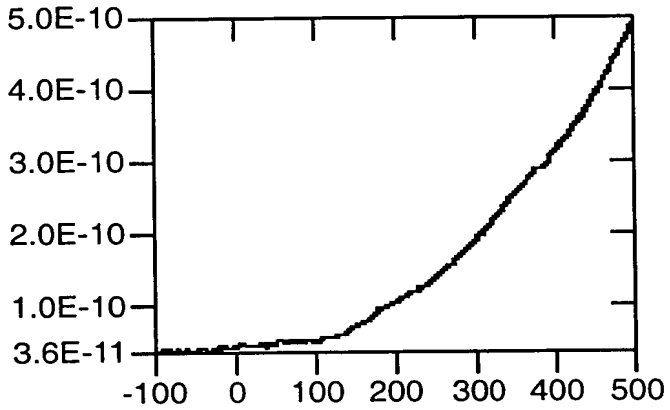


FIG._63

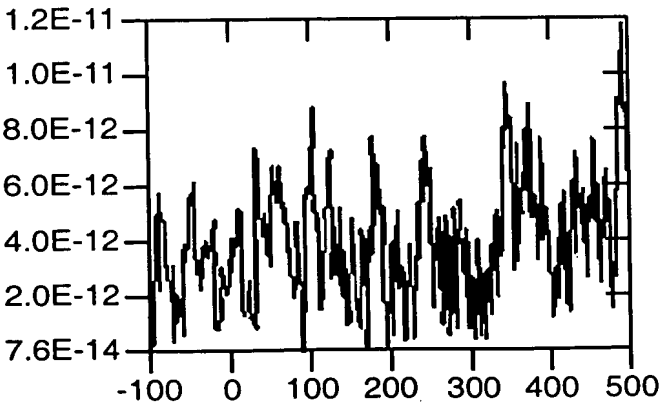


FIG._64

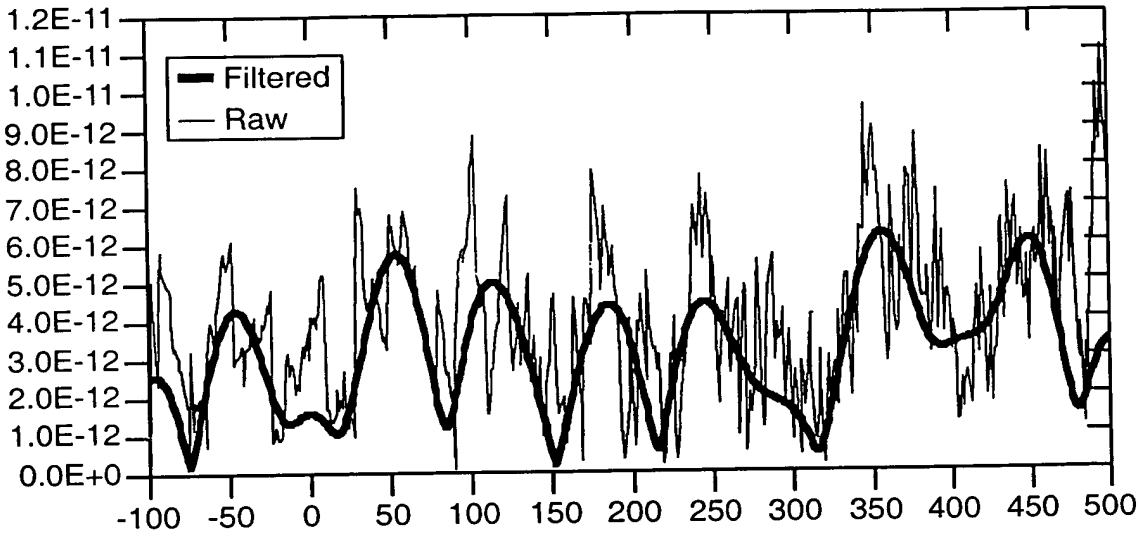


FIG._65

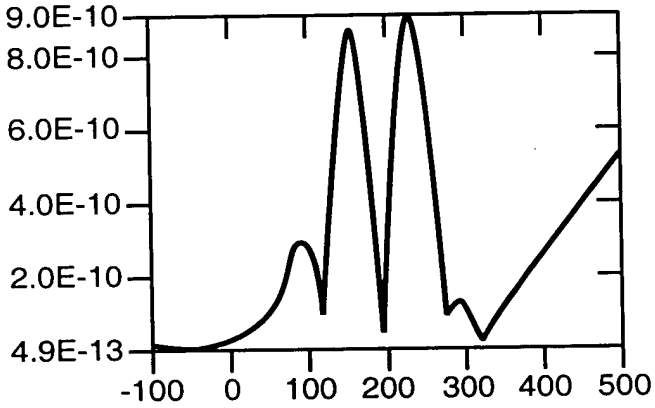


FIG._66

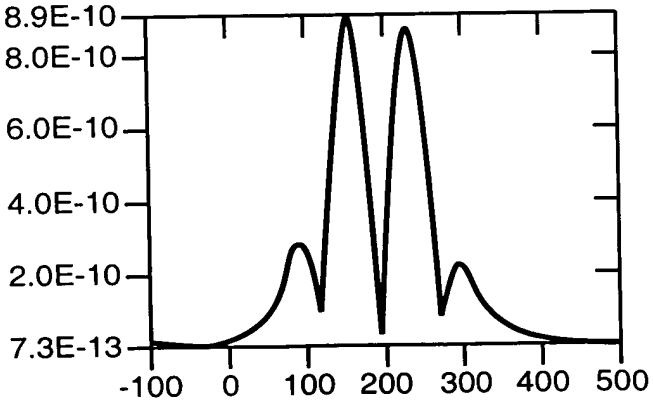


FIG._67

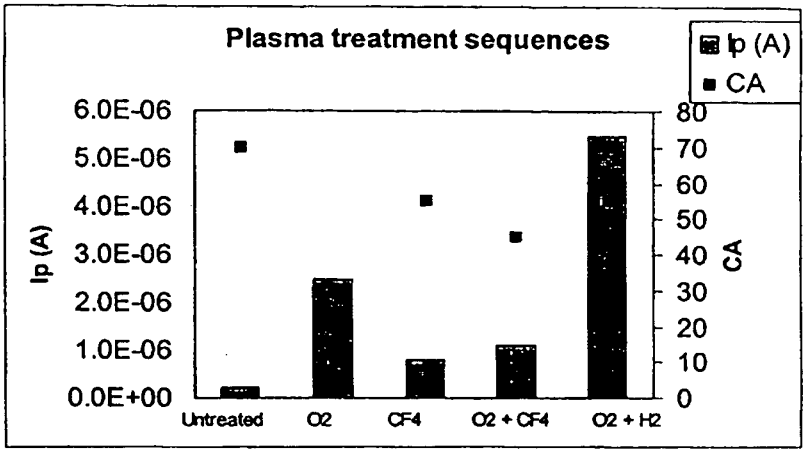

Plasma treatment sequences
Ip (A)
CA
6.0E-06
5.0E-06
4.0E-06
3.0E-06
2.0E-06
1.0E-06
0.0E+00
80
70
60
50
40
30
20
10
0
Untreated
O2
CF4
O2 + CF4
O2 + H2

Fig. 68

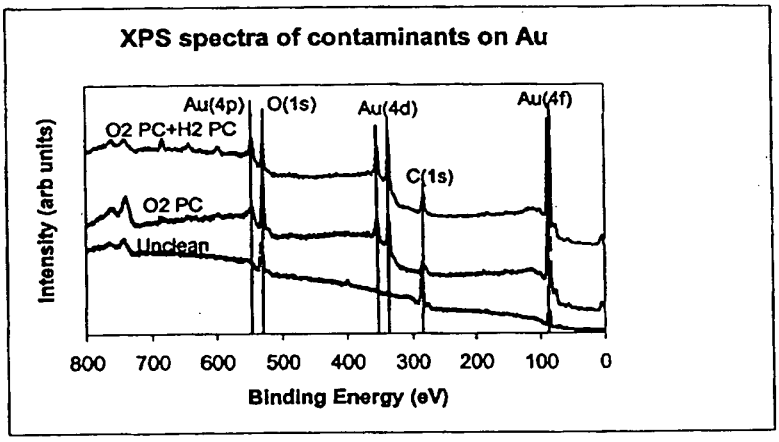

XPS spectra of contaminants on Au
Intensity (arb units)
Au(4p)
O(1s)
Au(4d)
Au(4f)
C(1s)
O2 PC+H2 PC
O2 PC
Unclean
800
700
600
500
400
300
200
100
0
Binding Energy (eV)

Fig 69